



REPORT

REGENERATIVE AGRICULTURE: FARM POLICY FOR THE 21ST CENTURY

Policy Recommendations to Advance Regenerative Agriculture



© Marissa Leshnov for NRDC
Founder Leslie Wiser resting her hand on the soil while tending to weeds at Radical Family Farms in Sebastopol, California.

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Executive Summary

Agriculture currently accounts for 10 percent of the United States' greenhouse gas (GHG) emissions. Within agriculture, the largest source of GHG emissions are industrial farming practices that degrade soil health, pollute waterways, and harm biodiversity, followed by industrial animal production at confined animal feeding operations. Industrial agriculture is part of the climate problem. Regenerative agriculture, on the other hand, provides a path for agriculture to be part of the climate solution. Regenerative agriculture, a land management philosophy that focuses on farming and ranching in harmony with nature, presents a contrast to the dominant industrial agricultural model. By using principles and practices that build soil health, regenerative farmers and ranchers sequester carbon, clean waterways, and protect wildlife.

Currently, federal agricultural policy disproportionately serves industrial agriculture over regenerative agriculture. To learn more about how we can change policy to advance regenerative agriculture, we interviewed 113 farmers and ranchers across the country. Our interviewees told us what regenerative agriculture means to them, the opportunities to bring more acres under regenerative management, and the barriers standing in the way. They stressed that the larger food system needs reform to enable more regenerative agriculture and to support existing regenerative growers.

To ground the national conversation on regenerative agriculture in the lived experiences of growers, this report summarizes what we learned from those interviews. We then provide on-farm and food system-wide policy recommendations to incentivize regenerative agriculture on the land and throughout the supply chain. In short, federal policy must invest in regenerative agriculture, diversify food systems infrastructure, support farmers and ranchers, and fund regenerative research and extension. Transforming agriculture into a climate solution requires transitioning to food and farming systems that protect, replenish, and steward our natural resources, particularly our soil. Regenerative agriculture can get us there.

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An aerial view of farmland in Colorado.

Introduction

Farmers and ranchers are among the first to feel the impacts of climate change on their livelihoods: Agriculture is threatened by hotter hot days and colder cold days; more frequent and more severe floods, droughts, hurricanes, and wildfires; and pressures from new pests and plant diseases.¹ These unpredictable weather patterns place immense stress on the people who grow and harvest our food, and when climate change disrupts agriculture, consumers are also affected. At the same time, the industrial model of U.S. agriculture is contributing to climate change and using practices that amplify its impacts. Regenerative agriculture, however, breaks this vicious cycle.

To learn more about regenerative agriculture, we went straight to the source—the farmers and ranchers who live it day in and day out. From single-acre farms to ranches that cover hundreds of thousands of acres, we interviewed 113 farmers and ranchers across the country to learn more about what “regenerative agriculture” means to them, how they regenerate, and why they choose to grow regeneratively. The definitions of regenerative agriculture provided in current literature do not embody the way farmers and ranchers described regenerative agriculture to us.² Simply put, there is no one-size-fits all definition. Regenerative agriculture is a place-based management philosophy whose adherents think about their land, their businesses, and their communities as dynamic ecosystems, contrary to today’s dominant industrial agricultural model.

Policy catalyzed agriculture into the sector it is today. For example, in the 1970s the secretary of the U.S. Department of Agriculture (USDA), Earl Butz, set a policy agenda to dominate global corn and soybean markets and pushed farmers and ranchers across the country to “get big or get out” of agriculture. The federal government provided incentives to dramatically expand crop production, control environmental uncertainty, and prevent crop losses—never mind the impacts these techniques had on the climate, soil health, or biodiversity. The country also invested heavily in infrastructure to help support the rapid industrialization of agriculture. Policy decisions turned agriculture into an emitter of greenhouse gases, to the point where it currently accounts for about 10 percent of all GHG emissions in the United States.³

© USDA NRCS



A field of cover crops growing among corn stubble.

The largest source of agricultural emissions are industrial cropping practices that disturb and degrade soil health, including tillage, monocropping, fallowing, and heavy use of chemical and fossil fuel–produced fertilizer.⁴ Unfortunately, these practices are used on most of the agricultural land in the country, and they degrade soil health so much that the United States lost 1.7 billion tons of it to wind and water erosion in 2017 alone.⁵ Carbon is naturally stored in soil, so losing soil to erosion prevents agricultural land from sequestering carbon from the atmosphere. Another source of agricultural emissions comes from industrialized animal production facilities called confined animal feeding operations (CAFOs), also known as feedlots. CAFOs and the manure lagoons that accompany them emit methane, a potent greenhouse gas; in fact, CAFOs are the second-largest agricultural source of GHG emissions in the country.⁶ They also pollute waterways, including drinking water supplies for millions of rural Americans. Industrial agriculture continually extracts our natural resources without replenishing them—a practice that the 1930s Dust Bowl taught us was unsustainable.⁷

Unfortunately, our nation’s quest to reward scale has also led to massive consolidation of agricultural infrastructure.⁸ Now, only four agribusinesses largely control what seeds and fertilizers farmers can purchase.⁹ Four companies control more than 80 percent of the country’s beef processing, 70 percent of the country’s pork processing, and 60 percent of the country’s sheep and lamb processing as well.¹⁰ And the story in poultry is similar: More than 97 percent of American

chicken is raised under contract for large, vertically integrated companies, and four companies control 53 percent of the poultry market.¹¹ The companies that control processing also dictate how farmers must raise their animals, which stifles innovation.¹² Farmers must take on increasingly large loans to farm at the scale needed to fulfill their contracts with these big companies, and the local businesses that previously supported agriculture—the mills, silos, and seed-cleaning facilities—are dying due to consolidation.¹³ These businesses and the independent farmers who were emblematic of rural America are disappearing.¹⁴ Crushed under cycles of debt, current farmers struggle with their mental health, and younger generations do not see farming as a viable career.¹⁵

We must reverse agriculture’s trajectory. Policy shaped our current situation, and policy can change it.¹⁶

Regenerative agriculture’s management philosophy of farming in harmony with nature offers an alternative vision of what agriculture can be—a system that helps us fight the climate crisis, grow healthier food, protect the environment, rebuild rural farming communities, and make farming profitable again. The regenerative farmers and ranchers we interviewed for this report told us that by



A cross section of healthy soil in a field of cover crops on a farm in Massachusetts.

adopting regenerative agriculture and using practices that build soil health, like cover cropping, they felt better prepared for climate change, reduced their risk, kept more money in their pockets, and restored ecosystems. Instead of continually extracting natural resources, regenerative agriculture gives back to the land. Instead of controlling environments to grow more crops, it encourages farmers and ranchers to make management decisions based on what natural resources are available and what they observe in and around the soil. These ideals have been embraced by Black, Indigenous, and people of color (BIPOC) farmers for centuries.¹⁷

Our interviewees also helped us develop a deeper understanding of how we can reform the broader food system to be more inclusive of regenerative agriculture and groups that have been historically disenfranchised by federal agricultural programs.¹⁸ In this report, we present policy recommendations to transition more of United States agriculture to regeneratively managed systems—policies that are inspired by the lived experiences of farmers and ranchers. You can read more about our methodology in Appendix A.

This report is broken into two parts. The first part distills our findings about regenerative agriculture, including the benefits it provides to our climate and biodiversity crises. The second part delves into the policies needed to remedy decades of degradation and consolidation and increase investment in regenerative agriculture. Farming for the 21st century and beyond requires reimagining our agricultural system; regenerative agriculture can get us there.¹⁹

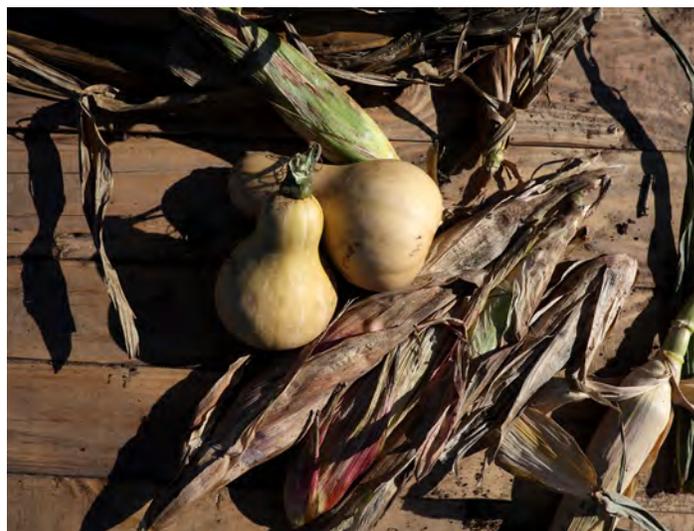
Part 1: What Is Regenerative Agriculture?

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Farmer Levi Lyle using his tractor to crimp a cereal rye cover crop while planting soybeans on his farm in Keokuk County, Iowa.

© Stephanie Foden for NRDC



Squash and corn harvested from the community garden in Kahnawake Mohawk Territory, a First Nations reserve of the Mohawks of Kahnawá:ke, on the south shore of the Saint Lawrence River in Quebec, Canada.

Regenerative agriculture is a land management philosophy whereby farmers and ranchers grow food and fiber in harmony with nature and their communities.²⁰ The regenerative philosophy is rooted in Indigenous wisdom: For millennia, Indigenous communities grew food and stewarded resources following natural cycles while using practices that replenished natural resources. For example, the regenerative practice of crop diversity is heavily influenced by the Indigenous practice called the “three sisters”—the planting of corn, beans, and squash together.²¹ In using regenerative agriculture’s principles and decision-making framework—detailed in Table 1—to manage their land and businesses, farmers and ranchers reap benefits such as building healthy soil and biodiversity, conserving ecosystems and water, growing healthy and nutritious food, and improving quality of life for themselves and their workers. For a more detailed description of each practice, see Appendix D.

The examples that follow illustrate how our interviewees use three of the regenerative principles to move as far away from the model of extractive industrial agriculture as they can and as a result transition their businesses toward a system that helps fight our climate crisis.

TABLE 1: REGENERATIVE AGRICULTURE DECISION-MAKING FRAMEWORK²²

Philosophy	Principles	Practices	
Farming and ranching in harmony with nature and the community	<ul style="list-style-type: none"> ■ Nurture relationships within the ecosystem ■ Prioritize soil health ■ Reduce reliance on fossil fuel–produced inputs ■ Nurture communities and reimagine economies ■ Understand the social and environmental context 	Cover cropping	Prairie strips
		No-till farming	Intensive rotational grazing
		Composting	Use of conservation buffers
		Use of perennial plants and diversified crops	Animal integration
		Crop rotation	Attention to animal welfare
		Reduction or elimination of chemical inputs	Contour planting
		Alternative pest management	Planting native species
		Agroforestry	Use of solar panels
		Silvopasture	Pasture cropping

For some of the ranchers we spoke to, nurturing relationships within the ecosystem meant following the natural birthing cycles of cows and calves and keeping livestock fed on perennial grasses year-round to promote animal welfare, avoid spending money on imported hay, and leave fresh manure behind to help build healthy soil. Following natural cycles can mean it takes regenerative ranchers upwards of two years to raise an animal for slaughter. In contrast, cows raised in industrial systems are weaned off their mothers after six months and then spend the last four to six months of their life in a feedlot where they are fed primarily grains to speed up weight gain.²³ Industrially raised cows are usually slaughtered 12 to 18 months after birth, about half the time of regeneratively raised cows.²⁴ But the tradeoffs are worth it: Ranchers told us that working on nature’s timeline produced cows with fewer health issues, better-quality meat products, and healthier soil.

© Jake Kristophel, Fallen Aspen Farm



Farmers and owners, Jake Kristophel and Desiree Sirois, of Fallen Aspen Farm, Pennsylvania.



A photo of Fallen Aspen Farm’s integrated poultry and sheep pasture operation.

Watching how fast our land regenerates, every year, is amazing to me. We’ve got orchids that I’ve never seen before, now growing out in our pastures. I’ve seen maybe 10 different species of birds, just on our property, that I’ve never seen in this area, like rare songbirds and sandhill cranes and all kinds of stuff. It’s fascinating. The whole working with nature thing is . . . I don’t know, my farm is my church.

—JAKE KRISTOPHEL, FALLEN ASPEN FARM, PA

Our interviewees also emphasized the importance of nurturing relationships with their communities to bridge the expanding gap between growers and consumers and provide financial stability. In the modern food system, we often don’t know the faces, names, or working conditions of the people who grow our food, and therefore we feel less invested in their success. In contrast, regenerative farmers and ranchers prioritize building relationships. These relationships not only help regenerative growers share how their on-farm practices mitigate climate change, but also help reduce financial uncertainty. For example, several farmers told us that they choose which crops to grow and animals to raise after listening to what their community wants, knowing that there will be people who want to purchase them (e.g., bitter melons for customers with roots in Asia; sumac for customers from North African and East Asian communities). They also mentioned the importance of an equitable food system in which underserved communities have access to healthy, fresh, affordable, and culturally appropriate food.



Farmer Davon Goodwin of Off the Land Farms in North Carolina with his daughter.

I feel like it's really important for me to be as inclusive as possible on our farm—revolve the farm around our community and the community around the farm. They're an integral part of my business plan. That exposure makes it easier for the farm to accept the community, and vice versa. Some of our practices look different. I'm managing a vineyard and not spraying toxic chemicals, so it's important for me to have conversations with fellow farmers about why I'm doing what I'm doing. Otherwise, people assume that we're just not doing our job because the farm looks so crazy.

—DAVON GOODWIN, OFF THE LAND FARMS, NC

Additionally, our interviewees told us how adopting multiple practices at once builds soil health faster while also making their farms more resilient to changing weather. Soil health is measured by soil's ability to function as a living system while maintaining air and water quality, performing other ecosystem duties, and sustaining plant and animal growth.²⁵ Regenerative farmers and ranchers prioritize soil biology and build soil health by using practices like cover cropping, diversifying their crops, and composting, which help sequester carbon. They observe surrounding ecosystems and adapt their practices accordingly, like choosing to grow crops that are suitable for their climate and geography, which helps them weather droughts and floods. They also plant trees at the edge of their farm if they're near a river, a practice that reduces agricultural runoff into waterways, sequesters carbon, and provides habitat for birds.



NRDC policy analyst Arohi Sharma holds soil in her hands while helping farmer Abby Zlotnick tend to crops at her farm, Juniper Farms, located on leased public lands owned and managed by Pitkin County, Colorado.

We've been farming here in our traditional Hopi lands since the 1200s, and we farm in this arid land because it has always been our way of life. The food we raise goes directly back to the community. All of our agriculture conservation techniques are place-based and designed to conserve soil moisture. The Hopi seeds and resulting crops—corn, beans, and squash—continue to adapt to our arid region and have so for over 2,000 years. The seeds and our surrounding environment help preserve the next generation of Hopi people and the continuance of the Hopi way of life.

—MICHAEL KOTUWA JOHNSON, MICHAEL'S FAMILY FARM, LOCATED ON THE HOPI RESERVATION, AZ

Above all, our interviewees stressed that context is key; a farm in southeast Georgia cannot be managed the same way as a ranch in Wyoming. The decision-making framework of regenerative agriculture—philosophy, principles, and practices—gives farmers and ranchers the tools they need to transition to regenerative agriculture regardless of where they are.²⁶ As we discuss in the following sections, these tools can also help farmers and ranchers increase carbon sequestration, conserve water, reduce their GHG emissions, save money, bolster their local economy, and be more resilient in the face of climate change.²⁷



Corn seedlings in a test plot of matted Austrian winter pea cover crops on an Iowa farm.

Carbon Sequestration Benefits of Regenerative Agriculture

U.S. agriculture is currently a net emitter of greenhouse gases, and of its current annual emissions, 290 million metric tons (MMT) of carbon dioxide equivalent (CO_2e), more than half comes from croplands (196 MMT of CO_2e).²⁸ Industrial agricultural practices like tillage, monocropping, fallowing, applying chemicals and synthetic fertilizers, and land conversions disturb and degrade soil, causing the release of carbon and other GHGs into the atmosphere.²⁹ The principles and practices of regenerative agriculture, on the other hand, help farmers and ranchers sequester more carbon in the soil, which helps build soil health and in turn can help mitigate the impacts of climate change (Appendix E).³⁰

Soil is at the heart of everything: plant health, air quality, climate resilience, reducing runoff, water quality. So, in terms of the big-picture return, absolutely, there are documented and long-term improvements with regenerative agriculture, and we expect to see more.

—SARAH COX, COX FAMILY FARM, NH

For example, by planting cover crops, which are seeded after a cash crop in soil that would otherwise be bare, regenerative farmers keep plants growing in the soil, which helps maximize photosynthesis.³¹ Through photosynthesis, plants take carbon from the atmosphere and convert it into the energy and sugars needed to grow. Whatever carbon a plant does not use to feed itself goes into the soil for storage—a process called sequestration.³² Additionally, practices like crop rotation, agroforestry, the use of perennials, and no-till farming also help sequester carbon from the atmosphere.³³ The 2021 report from the Intergovernmental Panel on Climate Change acknowledged the potential that regenerative agricultural practices have in removing carbon from the atmosphere and serving as a solution to fight climate change.³⁴ If U.S. agricultural soils were healthy, they could store up to 250 million metric tons of carbon annually—nearly enough to zero out current emissions from U.S. croplands.³⁵



Two fields after the 2019 flooding: The field on the left had been farmed for several years using cover crops and no-till practices. The field on the right, with standing water, had been farmed with conventional tillage and no cover crops.

Water Quality and Retention Benefits of Regenerative Agriculture

Farmers and ranchers also allow soil to absorb and retain more water and reduce erosion after adopting regenerative practices that build soil health.³⁶ Healthy soil acts like a sponge: When rain falls on a healthy field, water can infiltrate the soil instead of puddling and running off, which is what happens on fields with compacted, unhealthy soil.³⁷ In this way, soil is natural water infrastructure, and regenerative farms and ranches are better able to mitigate risk against droughts and floods.³⁸

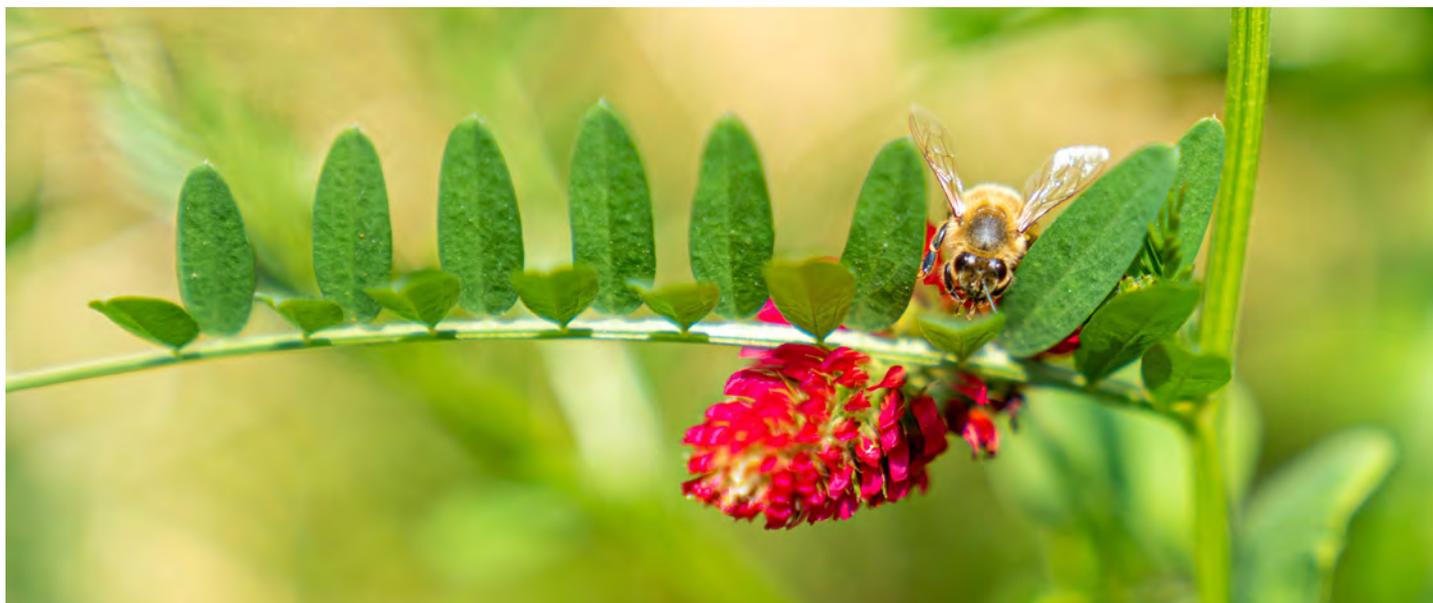
Having really good soil is the ultimate insurance policy on dealing with chaos. The definition of healthy soil is one that can bounce back quickly from unpleasant events, whether it's a flood or drought.

—ELLEN POLISHUK, PLANT TO PROFIT, MD

Healthy soil also improves water quality for surrounding ecosystems—like rivers and streams—and neighborhoods. It is better able to retain its structure and its nutrients during a rainstorm, which means less runoff and erosion from cropland into waterways.³⁹ And in the presence of other regenerative practices that reduce synthetic fertilizer and chemical use, the water that does leave regenerative farms and ranches for groundwater and nearby surface water is cleaner (Appendix E).⁴⁰ This, in turn, saves money for city, county, state, and federal agencies that are responsible for preventing environmental harms or for ensuring that this water is suitable for drinking or other uses.⁴¹ Water from industrial farms often has to be treated for nitrates and other agricultural chemicals that are associated with harmful algal blooms and public health problems like colon cancer and thyroid diseases.⁴²

Because of what we've done on the farm and because we're building the soil back up, we have water stored in the soil that allows the plants to take the water up even when we have a drought.

—IRUCKA AJANI EMBRY, GETTING BACK TO NATURE, KY



A bee lands on crimson clover growing in-between rows at Indy Urban Acres, Indianapolis, Indiana.

Biodiversity Benefits of Regenerative Agriculture

By reducing and eventually eliminating their use of chemicals and synthetic fertilizers, regenerative farmers and ranchers encourage biodiversity by protecting soil microbes, beneficial insects, and waterways. For example, the herbicides often used to kill weeds on croplands have the harmful side effect of also killing soil microbes and beneficial insects like earthworms and ladybugs.⁴³ Instead of applying herbicides to kill weeds, regenerative growers plant cover crops.⁴⁴ By letting cover crops grow, then cutting them and leaving the plant matter as residue on the land, they reduce the likelihood that weed seeds will germinate.⁴⁵ This helps farmers reduce their use of herbicides. Similarly, instead of spraying harmful insecticides to kill insects, regenerative growers plant diverse crops. Crop diversity attracts beneficial insects that keep pests at bay, which helps farmers reduce their use of harmful pesticides and insecticides.⁴⁶ Finally, instead of applying synthetic fertilizers to grow crops faster, regenerative growers use compost and the crop residue left on soil after terminating cover crops to provide nutrients and build healthier soil. Plants grown in healthy soil are stronger and better able to withstand infections, which reduces the likelihood that a farmer will have to spray a plant with a pesticide to prevent infections.⁴⁷ Regenerative growers also plant hedgerows and prairie strips to prevent soil erosion, and these practices build pollinator habitats, including for the imperiled monarch butterfly.⁴⁸ By using practices that protect soil health and reduce the need for chemical inputs, regenerative agriculture restores and preserves ecosystems for soil microbes, pollinators, and other wildlife.

Bison are a keystone species of the American prairie. When you reintroduce them to their native home, you start to see a lot of changes; native plant species are growing here again. Even in areas that were tilled for a hundred years, more native plant communities are returning along with different types of birds and wildlife. And we're creating a ranch that works with the ecosystem rather than against it.

—BRITTANY MASTERS, ROAM FREE RANCH, MT

Regenerative agriculture also encourages farmers and ranchers to reintegrate animals into cropping systems in ways that nurture relationships within the ecosystem, further improving biodiversity on the land and potentially helping improve soil health.⁴⁹ For example, animals like sheep, goats, chickens, and cows can graze fields and eat weeds, reducing the need for toxic herbicides, and their manure can be used as a natural soil amendment, reducing the need for synthetic fertilizers.⁵⁰ Proponents of industrial agriculture claim that reducing chemicals and synthetic fertilizers harms yields, but this is not the case. Using multiple regenerative practices simultaneously—like cover cropping, crop diversity, and animal integration—allows farms and ranches to reduce harmful chemicals and support the natural ecosystem, which both ensures a robust yield and protects biodiversity.⁵¹



The farm crew at Frith Farm in Maine.



Interplanting several crops and flowers to grow biodiversity and offer habitats for pollinators on Frith Farm.

If a pest finds one of our crops, there are many other insects that are natural predators of that insect. With enough diversity, it's all held in balance. It's not that we don't have any pests, but what pests we have are held in check by all the other life on the farm.

— DANIEL MAYS, FRITH FARM, ME

Financial Benefits of Regenerative Agriculture

In addition to the cost savings from reducing or eliminating the use of harmful chemicals and fertilizers, regenerative growers add more sources of revenue by diversifying what and how they grow. Instead of selling one or two commodities for income, which is what happens with the dominant industrial agricultural model, regenerative practitioners can pool incomes from animal products and multiple crops, as well as from farm stays, agritourism, and value-added goods like jerky or jam. Regenerative agriculture also encourages growers to sell into a variety of markets, including not only larger contract buyers but also markets that connect farmers and consumers, such as Community-Supported Agriculture (CSA) shares, direct sales to consumers, farmers markets, food hubs, restaurants, and public institutions like schools. In other words, regenerative growers do not put all their eggs in one market basket.

DIVERSIFIED FARMS AND VALUE-ADDED PRODUCTS CREATE A MORE RELIABLE REVENUE STREAM

Spoon Full Farm, east of Seattle, is owned and managed by a group of beginning farmers who converted land from a conventional hay farm to grow food for nearby communities. They grow a variety of vegetables in their market garden, raise chickens and grass-fed beef, and sell a hot sauce called "Sun Sauce," made from their crops and produced out of a local commercial kitchen, as a value-added top seller at local farmers markets. Over time, Spoon Full Farm has made changes in its business—like deciding not to raise egg-laying chickens due to local wind conditions—and the diversity of products they produce helps their farm to be more resilient as they grow their business.

When the restaurants closed unexpectedly, we had to struggle to find new customers to pick up the losses. We decided to have our own restaurant on wheels. We purchased a food truck, and our hope is that we will be able to sell directly what we raise here at the farm through the food truck, which will give us a lot more financial stability, because if a restaurant shuts down, or if they go from ordering 100 chickens a week to ordering 30 chickens a week, now we don't have to struggle to try to figure out what to do with all the leftovers. We can just use that on our own food truck; we can be selling our own farm-to-table food out there."

— ESTER BISHOP, GNARLY VINES FARM, RI

Strengthening Communities Through Regenerative Agriculture

One of the tenets of regenerative agriculture is cultivating relationships among the farming and ranching community, surrounding neighbors, and consumers, and our interviewees spoke about their relationships to communities in two ways.⁵² First, they said that adopting regenerative agriculture made them part of a group of like-minded growers, which eased the transition to regenerative management. Second, they told us that adopting regenerative agriculture had helped strengthen their connections to non-farming communities while growing healthier food for them.

It's really become a point of pride for us. We want to grow food for our community because we feel like we're part of this community.

— AMARI FAUNA AND CHLOE FLORA, HEDGE ROSE FARM, OR

© USDA/FPAC photo by Preston Keres



A member of the Sang Lee Farms staff harvests ginger, in Peconic, New York.



© USDA photo by Preston Keres

Communities learn to pick collard greens before gleaning a field at Miller Farms in Clinton, Maryland.

A regenerative farming community provides more than just a set of helping hands during times of crisis like a flood or wildfire. Mentors make themselves available to advise new or transitioning regenerative farmers on specific practices. Workshops, conferences, and field days when other interested farmers are invited to a regenerative farm to observe how principles are applied provide opportunities to exchange information, share equipment, and organize.⁵³ Seeing farmers and ranchers adopt regenerative agriculture gives others the courage to buck cultural norms and start experimenting or continue experimenting—an important barrier to overcome to scale up regenerative management on more acres. Farming communities also come together to create farming cooperatives, which help small farmers and ranchers aggregate their market power and get a greater share of the profits from sales.

Interviewees also spoke about adopting regenerative agriculture as a management philosophy to grow healthier, more nourishing food for their community. By reducing the use of harmful pesticides, they protect natural resources, farmworkers, and surrounding communities from exposure to toxic chemicals. On-farm visits and farm days help regenerative growers build stronger relationships with families, kids, and other customers. In turn, visitors learn about the environmental benefits of regenerative agriculture and share what they learn with others. These direct relationships help growers maintain a dedicated consumer base, which contributes to their financial security and can help keep agricultural businesses alive during periods of crisis, like a pandemic.⁵⁴ Beyond that, these relationships help regenerative growers feel that folks are invested in their success and supportive of the changes they're making to move agriculture toward a climate solution.

One of our base needs as humans is connection. It is natural to include that as part of the farm's mission. I see food as a natural way that we are all connected. We all eat, and we all want to eat well. Fostering that sense of community and connection to place feeds right into the business side of the farm. We're creating a connection with our customers that goes beyond conventional marketing values, and people are loyal to us beyond simply providing money for our products. It's more than a transactional relationship that we have with our neighbors and customers. I try to have a dialogue through example, to show people how good this food tastes, and how meaningful it can be to see where it's grown and to have your kids run around and sample it from the fields.

— DANIEL MAYS, FRITH FARM, ME

Part 2: Policy Recommendations to Expand Regenerative Agriculture

© Courtesy of Daniel Mays



Aerial of Frith Farm, Maine.

Regenerative agriculture can transition agriculture into a climate solution—but overhauling an industry is not simple. We asked our interviewees what prevented them from being more successful, what prevented other farmers and ranchers from making the transition, and where they saw opportunities for growth in the regenerative agriculture movement. We used qualitative analysis software (as detailed in Appendix A) to analyze their answers and found four primary areas of reform that would facilitate the expansion of regenerative agriculture:

- 1. Level the federal investment playing field and incentivize regenerative stewardship.** Reform the policies that created today's dominant industrial agriculture model to promote and reward regenerative agriculture.
- 2. Invest in more decentralized and diverse food systems infrastructure.** Build the infrastructure that creates additional market and operational capacity for regenerative growers.
- 3. Support regenerative farmers and ranchers.** Increase support for farmers and ranchers during their beginning or transitioning years, break barriers for BIPOC growers to access federal programs, and revive the civilian conservation corps to expand conservation on private lands.
- 4. Fund regenerative agriculture research and extension.** Improve the technical resources offered through extension and public research institutions to meet the needs of regenerative farmers and ranchers and value the ecosystem services that regenerative agriculture provides.

Our policy recommendations tackle the four most prevalent issue areas mentioned by our interviewees, but we want to be clear that our list does not represent the complete universe of policy ideas. Many readers may be more familiar with organic agriculture given its history and formalization through the National Organics Program. NRDC supports a variety of agricultural approaches that help turn farming into a climate solution, including both regenerative and organic agriculture. Some of this report's policy recommendations build on the existing strengths of the organic program; however, given this report's focus on regenerative agriculture, we do not include specific policy recommendations for the National Organic Program.⁵⁵

Moreover, the ideas included in this report are specific to NRDC's strengths as an environmental advocacy organization, and because of this, there are many good ideas for supporting farmers and ranchers that we did not include, like student loan forgiveness and providing affordable health insurance. Furthermore, the recommendations focus largely on how to reform, support, and expand federal policies, but they are not restricted to the Farm Bill or exclusive to USDA's jurisdiction. While government policy is a main driver for expanding regenerative agriculture, it is not the only driver; public-private partnerships and the private sector also have roles. Additionally, while some of our policy recommendations may benefit farmworkers, we did not include farmworkers in the scope of our interviews. We acknowledge this gap.

Last, we use the term *BIPOC* at times, and at other times we use phrases like *socially disadvantaged* or *limited-resource farmer*. The latter phrases are defined in federal statute, so we use them when we recommend changes to existing policies and programs. Details about our methodology can be found in Appendix A.



A video still from aerial footage shot for 'On Location: Cover crops' of a combine driving next to a field of cover crops on Aaron Lehman's farm in Polk County, Iowa.

LEVEL THE FEDERAL INVESTMENT PLAYING FIELD AND INVEST IN REGENERATIVE STEWARDSHIP

This section of the report addresses necessary reforms in federal spending on agriculture, as well as programs worthy of increased investment. On the former point, federal farm subsidies, including crop insurance and direct payment programs, cost more than \$68.1 billion annually.⁵⁶ These subsidies disproportionately support a few commodity crops (e.g., corn, soybeans, wheat, cotton, and sugar), which encourages and provides a safety net for large, monoculture farms. These same commodity subsidies benefit the livestock industry by providing a cheap source of feed that flows to industrial feedlots.⁵⁷ Regenerative farmers, however, try to grow a diversity of crops and vegetables that do not receive the same level of support from these federal subsidies.⁵⁸ Moreover, government subsidies artificially lower the price of some crops, making it harder for regenerative producers to compete in the market.

To the latter point, federal and state conservation programs that fund regenerative agriculture (and other climate-mitigating farming programs like organic agriculture) are historically underfunded. Within the Farm Bill, which is the largest piece of agricultural legislation in the country, conservation programs receive only 7 percent of total bill spending.⁵⁹ These important programs, such as the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP), provide funding to farmers to offset the cost of practices that improve soil health and water quality and help farmers be more resilient to climate while becoming part of the climate solution. However, due to insufficient funding, between 2010 and 2020 just 31 percent of farmers who applied to EQIP and 42 percent of those who applied to CSP were awarded contracts.⁶⁰ We support increased funding for conservation programs along with efforts to ensure that those program funds are made easily accessible to socially disadvantaged farmers.

Reforms to the Federal Crop Insurance Program

The Federal Crop Insurance Program (FCIP) is currently the largest farm subsidy program in the Farm Bill; projected spending for the program is \$77.9 billion over the next 10 years.⁶¹ The FCIP subsidizes individual crop insurance premiums, administrative costs of insurance providers, and underwriting risk. While many farmers view the program as a critical safety net, others have warned that it stands in the way of holistic cropping systems.⁶² For example, because most crop insurance policies insure individual crops on specific fields, the premium rates for those policies are based on the 10-year production history of those particular crops on those particular fields. It is difficult to establish a yield history for operations that rotate a diverse array of crops.⁶³ The more crops in rotation, the longer it takes to establish 10 years of history for any individual crop—for example, it would take 40 years to establish a yield history for each crop in a four-crop rotation. Furthermore, many types of crops are not covered under the FCIP (e.g., small grains integrated into soybeans), which makes it even more difficult for farmers looking to diversify what they grow.

Finally, the risk-mitigating benefits of soil health management practices (particularly resilience to flood and drought) have not been built into the actuarial tables that inform FCIP crop insurance policies and premiums. This results in a missed opportunity to incentivize practices that reduce risk and lower the cost of taxpayer-subsidized payouts.

The FCIP covers 90 percent of U.S. cropland, giving it enormous influence over the national agricultural landscape. If deployed correctly, the program could provide opportunities to invest public resources into regenerative agriculture. The following recommendations can help with that transition.⁶⁴

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Cover crops in a corn field on a farm in Beadle County, South Dakota.

Cover Crop Program (PCCP). In 2021 and 2022, USDA's Risk Management Agency (RMA), which administers the FCIP, took a significant step in the right direction with the PCCP, which offered farmers who planted cover crops in those crop years a \$5 per acre reward to be subtracted from their crop insurance premium bills, provided the cover crop acres were registered with the Farm Service Agency (FSA).⁶⁷ We recommend that Congress authorize long-term funding for a crop insurance savings program for soil health practices modeled on the PCCP. The program has already played an important role in encouraging farmers to certify their cover crop acres, enabling the USDA to better track cover crop planting and analyze the impact of the practice on risk. By providing better data, this program will help RMA's analysts determine whether cover crops are in essence paying for themselves by reducing the federal cost of indemnity payments, per our recommendation to offer a performance-based discount. Committing to future years of funding for the PCCP or a similar program will encourage even more farmers to plant cover crops, benefiting climate, water quality, and biodiversity while making farmers more resilient. We strongly encourage the USDA and Congress to continue and increase support for this program in the future.

Finally, since the RMA oversees the FCIP, it should adopt insurance premium formulas that account for the risk mitigation of soil health management practices, such as cover cropping diverse crop rotations, to more accurately assess and minimize risk from flood and drought events, rather than relying solely on yield and price-based formulas.

Provide Good Stewardship and Performance-Based Insurance Premium Discounts

As a first step, the FCIP should include a good stewardship or performance-based discount that rewards farmers who use good soil health practices with a higher premium subsidy or an adjusted insurance premium rate.⁶⁵ The USDA has existing authority in Section 523(d) of the Federal Crop Insurance Act to pilot a performance-based discount that would adjust insurance rates for practices proven to reduce risk of crop failure.⁶⁶ Congress could direct the USDA to act on this authority and create a program that adjusts insurance rates for farmers whose practices reduce harm to crops caused by drought, flood, intense heat, and other extreme weather made worse by climate change. These rate adjustments could increase the adoption of regenerative practices that improve soil health and mitigate damage to crops, which, in turn, should lower the cost of crop insurance over time.

The quickest way to offer incentives for good stewardship under the FCIP may be to expand and extend the Pandemic



Multiple cover crops growing on a farm in South Dakota.



Sang Lee Farms, in Peconic, New York, transitioning to third generation, grows more than 100 varieties of specialty vegetables, heirloom tomatoes, baby greens, herbs. They continue to feature Asian produce, growing many varieties of Chinese cabbages, greens, and radishes.

Scale Up Use of Whole-Farm Revenue Protection Program

Another change that would transition the FCIP toward a more regenerative and equitable system involves the Whole-Farm Revenue Protection Program (WFRP), an alternative to traditional yield-based crop insurance that is based on total farm revenue rather than the yield of individual crops. Currently a small program, the WFRP allows farmers to insure more diverse crops and allows insurers to take a broader view of farm success than the yield of individual commodity crops. Greater investments in staff training and resources for the WFRP could increase awareness about the program and help support regenerative farmers and farmers transitioning to regenerative agriculture.

Reduce and Reform FCIP Subsidies

The FCIP should be reformed to drop harmful provisions that cushion risk in an unsustainable monoculture system, like the “yield-exclusion provision,” which allows farmers to drop bad-yield years from the histories that determine their insurance rates. Other FCIP subsidy reforms include reducing subsidies that don’t provide direct conservation benefits, implementing income caps for eligibility, and expanding conservation compliance provisions that require conservation practices in return for subsidies. All of these measures have support from many farmers and reform advocates who see current subsidies as disproportionately helping monoculture cropping and consolidation and as a barrier to widespread adoption of innovative, regenerative farming.

Use FCIP Savings to Offset Transition to Regenerative Agriculture

Finally, we recommend creating a program that uses the money the federal government saves on FCIP payments—because of increasing healthy soil-building practices—to help other growers transition to regenerative agriculture. As previously mentioned, the 10-year cost of the FCIP is projected to be \$77.9 billion; if transitions to regenerative agriculture resulted in saving even a small percentage of that sum, and those savings were reinvested as up-front payments to farmers looking to transition, it would greatly increase investments in regenerative agriculture.⁶⁸ The Regenerative Future Capital Project was mentioned by one of our interviewees as an investment model that gave us inspiration for this idea.⁶⁹



Showing samples of healthy soil incorporating deep rooting cover crops (left) and unhealthy compacted soil (right) at Linker Farms in Judith Basin County, Montana.

Create More Risk Management Options

In addition to the FCIP, USDA offers other types of coverage to farmers affected by disasters that can be linked to climate change, such as flooding and hurricanes.⁷⁰ Because healthy soils play a critical role in disaster preparedness and because flooding, wildfires, drought, and other extreme weather events have become more frequent, tying improvements to soil health to other risk management programs can create an incentive for growers who do not participate in FCIP to implement regenerative practices. Many of the USDA's Disaster Assistance Programs (DAP) can be amended to reward growers for using practices that build soil health and thereby reduce their on-farm risk, and encourage new growers to do the same. The following DAP programs can be modified so that growers—especially

beginning, socially disadvantaged, limited-resource, and military farmers—who already participate in an existing state or federal soil health conservation program, and who use those conservation funds to implement regenerative practices listed in Table 1, receive additional benefits.

- The Livestock Forage Disaster Program (LFP) offers payments to eligible livestock owners and contract growers who have suffered a loss of grazed forage due to drought during a normal grazing period.⁷¹ LFP's monthly payment rate is 60 percent of the monthly feed cost, not to exceed \$125,000 in total. As droughts become more frequent due to climate change, we recommend increasing the monthly payment rate and total payment limit for any farmer or rancher who participates in a federal or state soil health conservation program and uses the conservation funds to implement practices listed in Table 1, with priority access to funds given to beginning, socially disadvantaged, limited-resource, and military farmers.
- The Livestock Indemnity Program (LIP) offers eligible livestock owners and contract growers coverage for livestock deaths caused by adverse weather, disease, and attack by animals reintroduced into the wild by the federal government.⁷² Some industrial livestock growing practices, like CAFOs, can leave animal operations more vulnerable to disease and the impacts of extreme weather.⁷³ The densely crowded environments of CAFOs lead to the quick spread of disease among animals; moreover, many CAFOs are located in regions that are frequently impacted by disasters exacerbated by climate change, like hurricanes and flooding. For example, CAFOs and hog manure lagoons in North Carolina have been hit by hurricanes, and extreme flooding has caused hog manure lagoons in Iowa to overflow. In contrast, on regenerative farms, animals graze pastures and this, along with other regenerative practices, can help farms and ranches improve their resilience to flooding, drought, and disease by improving soil health. The LIP currently offers livestock owners 75 percent of the market value of the lost animals. We recommend that the LIP increase the coverage for livestock owners who participate in a federal or state soil health conservation program and use the conservation funds to implement practices listed in Table 1, with priority access to funds given to beginning, socially disadvantaged, limited-resource, and military farmers.
- The Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish (ELAP) offers financial assistance to growers for losses in livestock, honeybees, and farmed fish due to disease and adverse weather not covered by the LIP and LFP.⁷⁴ To incentivize producers to prioritize soil health, we recommend increasing coverage for growers who participate in a federal or state soil health conservation program and use the conservation funds to implement practices listed in Table 1, with priority access to funds given to beginning, socially disadvantaged, limited-resource, and military farmers.
- The Noninsured Crop Disaster Assistance Program (NAP) offers basic coverage for noninsurable crops impacted by disasters that result in low yields, loss of crops, or prevented plantings. Producers are required to pay service fees not to exceed \$1,950, and the maximum premium for a producer is \$15,750.⁷⁵ We recommend increasing the premium reduction to farmers who participate in a federal or state soil health conservation program and use the conservation funds to implement practices listed in Table 1, with priority access to funds given to beginning, socially disadvantaged, limited-resource, and military farmers.
- The Emergency Watershed Program (EWP-Recovery) provides partial funding to communities and private landowners, including growers, for disaster-recovery efforts that help reduce hazards to life and property caused by natural events. Currently covered projects include removing debris, protecting eroded banks, repairing drainage facilities, fixing levees, planting vegetative cover on eroding lands, and restoring conservation practices.⁷⁶ We recommend expanding this program beyond just responding to the damages of disasters, to provide funding for communities and private landowners

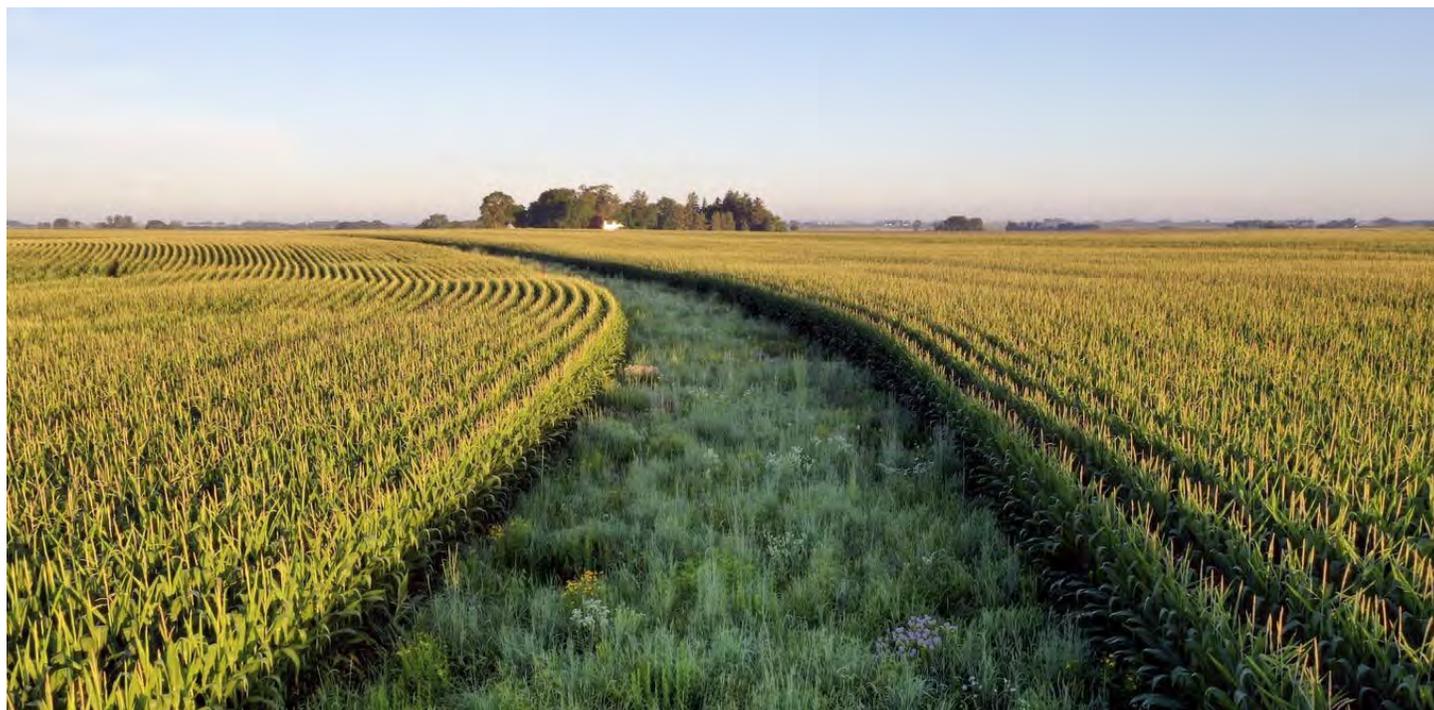
to implement resiliency projects that build soil health to help combat the adverse impacts of natural disasters. With its increased ability to absorb rainwater, healthy soil can decrease soil erosion and potential flooding, ultimately improving disaster-preparedness infrastructure for many communities.

- The Emergency Conservation Program (ECP) provides emergency funding and technical assistance to growers to restore farmland and conservation practices damaged by natural disasters. ECP will reimburse up to 90 percent of restoration costs for beginning, socially disadvantaged, or limited-resource farmers and ranchers, and up to 75 percent for all others. These payments are limited to \$500,000 per person per disaster, with up to 25 percent available as an advance payment for fencing.⁷⁷ Our interviewees said that footing the up-front costs and then waiting for reimbursement is a barrier to implementing regenerative practices. Therefore, we recommend increasing the advance payment of the cost share to at least 50 percent for all practices. We also recommend expanding the list of eligible farmland practices beyond just repairs, to include soil health-building practices that make farmland more resilient, such as planting cover crops and improving compost infrastructure. By focusing federal funding on preparedness rather than solely on restoration, the USDA can help farmers and ranchers improve their climate resilience and better prepare their farmland to weather the impacts of climate change.

Increase Baseline Funding for Farm Bill Conservation Programs

Title II of the Farm Bill (the Conservation title) provides most of the federal funding for agricultural practices that regenerate the land. Programs like the Conservation Stewardship Program (CSP) help farmers pay for good stewardship practices, like improving their grazing system, adopting nutrient management plans, and using diverse cropping rotations.⁷⁸ Another program, the Agricultural Conservation Easement Program (ACEP), helps landowners keep land in farming and protect it from development.⁷⁹ Unfortunately, overall funding for these programs has not been substantially raised to meet demand, despite the best efforts of conservation and sustainable agriculture groups.⁸⁰ As a result, 40 percent of qualified applicants are turned away from Title II Farm Bill conservation programs due to lack of funding. In line with other supporters of conservation programs, we recommend that Congress at least double the mandatory funding baseline (or the total annual amount budgeted through federal appropriations) for conservation programs, ideally over a 10-year period.

However, it's not enough to just increase funding. It is important to ensure that conservation program funding is equitably distributed to small, beginning, and socially disadvantaged farmers, and that the funding is not used to support unsustainable and harmful industrial agricultural practices or systems, like CAFOs.⁸¹



Prairie Strips on a farm in Iowa. Prairie strips are a conservation practice that protects soil and water while providing habitat for wildlife.

Increase Support for the Conservation Reserve Program and Continuous Conservation Reserve Program

The Conservation Reserve Program (CRP) pays farmers to forgo farming on marginal land (land that has low agricultural productivity) for an extended time period, usually 10 to 15 years, in order to improve soil and water quality and wildlife habitat.⁸² Through a competitive bid system, the FSA uses a variety of factors to determine which agricultural lands to enroll in the CRP. The 2018 Farm Bill capped the number of acres enrolled in CRP at 27 million by 2023.⁸³ The program is so popular that the FSA had to temporarily stop taking applications for enrollment in 2018.⁸⁴ As of 2019, 24 million acres had already been enrolled in CRP.⁸⁵

Within the CRP are two additional programs that support further conservation efforts, the Continuous Conservation Reserve Program (CCRP) and the Conservation Reserve Enhancement Program (CREP). The CCRP enrolls highly environmentally important land into the program without a competitive bid process.⁸⁶ Farmers and landowners can enroll land in the CCRP on a rolling basis, as long as the land is continuously devoted to certain conservation practices.⁸⁷ Total enrollment is capped at 8.6 million acres by 2023, but 7.3 million acres were enrolled in CCRP as of 2016, significantly limiting future participation.⁸⁸ CREP addresses specific state or national conservation concerns.⁸⁹ CREP acres are removed from production and enhanced with resource-conserving plant species or converted to filter strips, wetlands, or riparian buffer zones.

Overall, the CRP—including CCRP and CREP—provides a myriad of environmental benefits. To date, CRP has prevented more than nine billion tons of soil erosion (enough soil to fill 600 million dump trucks), reduced nitrogen and phosphorus runoff, sequestered an annual average of 49 million tons of greenhouse gases (equivalent to taking nine million cars off the road), and created more than three million acres of restored wetlands while protecting more than 175,000 stream miles with riparian forest and grass buffers.⁹⁰ CRP also benefits bees and other pollinators and creates habitats for ducks, pheasants, turkeys, bobwhite quail, prairie chickens, grasshopper sparrows, and many other bird species.⁹¹

The program is popular. Unfortunately, the low caps on acreage enrollment leave little hope for future applicants. Congress should increase appropriations for CRP and increase the number of acres eligible for enrollment.



A riparian buffer on a Texas farm.



Sang Lee Farms staff clean freshly picked Delicata Squash, in Peconic, New York .

INVEST IN DECENTRALIZED AND DIVERSE FOOD SYSTEMS INFRASTRUCTURE

Food systems infrastructure includes physical and market infrastructure, such as processing facilities, slaughterhouses, and procurement contracts, that helps farmers and ranchers get their goods to consumers. Current infrastructure privileges commodity crops and industrial agriculture. By investing in more decentralized and diverse food systems infrastructure, we can reduce or eliminate some of the many challenges facing regenerative farmers and ranchers in accessing markets and help transition more farmland toward regenerative systems. Today the infrastructure costs associated with transitioning land from industrial to regenerative farming is a barrier to entry. For example, once historic pastureland is converted to commodity crop production, it is very expensive to add fencing for rotational grazing to convert it back to its original use. Unfortunately, according to the farmers and ranchers interviewed for this report, funding for initial fence installation is not fully covered by most government grants.

Furthermore, the processing infrastructure that helps farmers and ranchers get their produce and livestock to market (i.e., processing and storage facilities and slaughterhouses) is overwhelmingly constructed to serve the needs of industrial agriculture.⁹² For example, today's USDA-inspected slaughterhouses can process tens of thousands of animals at a time—with capacity that high, these slaughterhouses prioritize booking appointments for farmers industrially raising livestock, making it difficult for smaller regenerative producers to get an appointment.⁹³ Regenerative growers told us they often drive hundreds of miles to USDA-certified facilities that are able to accommodate them. We need to reform the policies that contribute to consolidation and make it challenging for regenerative farmers and ranchers to survive while also reforming the subsidies that prop up the largest industrial facilities.

We must also expand existing infrastructure to help smaller, independent producers access markets and compete against industrial agriculture. USDA-inspected slaughterhouses, mobile meat processing units, mills, washing stations, seed cleaners, farming cooperatives, composting services and facilities to reduce food waste, warehouses for storage, food hubs, commercial kitchens, farming equipment, and business incubators are just some of the infrastructure examples our interviewees said they need more of to compete with their industrial counterparts. We can also leverage the power of public institutions (e.g., public schools, hospitals, and governments) to source food from regenerative farmers and ranchers.



Cattle grazing in a silvopasture on a ranch in Texas.

Transition Away From Industrial Meat Production

Meat production in the United States has changed dramatically in the past four decades. Around 50 years ago, we began separating animals from pastures, and today animals are nearly all raised in CAFOs.⁹⁴ Large agribusinesses now control all the phases of production and contract with individual farmers to operate CAFOs according to their own specifications.⁹⁵ Farmers take on significant amounts of debt to finance the facilities, antibiotics, and feed for growing animals at those specifications.⁹⁶ Farmers have lost their autonomy, and unfortunately, many are stuck in this system.⁹⁷ Even those who want to transition out and start a pasture-raised livestock business are often trapped under too much debt.⁹⁸ Meanwhile, public health is being harmed by the water and air pollution from CAFOs and their accompanying manure lagoons, and by the antibiotic resistance stemming from CAFOs' overuse of antibiotics.⁹⁹

At the same time, the federal government's grain and commodity crop subsidies provide CAFOs with significantly discounted feed, which allows large agribusinesses to keep the price of industrially produced meat low.¹⁰⁰

This model of meat production is extremely harmful and is the antithesis of regenerative agriculture. Policymakers must remedy how the industrial animal agriculture industry is kept afloat by taking the following actions:

- Reform the Federal Crop Insurance Program so that taxpayers are not subsidizing the cost of cheap grains for feedlots and biofuels.¹⁰¹ See above for our recommendations related to FCIP reforms.
- Pass legislation, like Senator Cory Booker's proposed Farm System Reform Act (FSRA), to limit CAFO expansion and help growers transition out of CAFO systems.¹⁰² The FSRA would make those who choose to transition eligible for a voluntary buyout program that includes debt forgiveness. It would also place a moratorium on the construction of new large animal feeding operations, restricting the industry's ability to trap farmers in the system. Successful reform of the CAFO system must also address the unfair market advantage that industrial agriculture enjoys, which is why FSRA also focuses on proper enforcement of the Packers and Stockyards Act (PSA) to protect regenerative producers from unfair market competition.¹⁰³
- Pass legislation that puts more responsibility on the large agribusinesses that contract with CAFO farmers. Large agribusinesses trap CAFO farmers in this system, and therefore they—and not individual farmers—must be responsible for the pollution caused by CAFOs and the infrastructure improvements needed to comply with environmental requirements. Unfortunately, this is easier said than done; heavy opposition from industrial agriculture groups and state-level departments of agriculture prevented passage of state laws that would have held large agribusinesses accountable in Kentucky, Maryland, and Georgia.¹⁰⁴ Despite this strong opposition from industrial agriculture, lawmakers must change this unjust system in which farmers are doomed to work hard for little profit, the public bears the environmental and public health cost of pollution, and the polluting agribusinesses retain most of the profit from the cheap meat produced.



An aerial view of buildings and waste holding ponds at a concentrated animal feeding operation (CAFO) in North Carolina.

- Eliminate provisions in the Farm Bill conservation programs that provide federal dollars to CAFOs. The Environmental Quality Incentives Program (EQIP) is a Farm Bill conservation program that spends millions of federal funds each year helping CAFOs comply with environmental laws by subsidizing the cleanup of waste from CAFOs through expensive waste lagoons and other treatments.¹⁰⁵ In other words, taxpayers pay CAFOs to not pollute our air and drinking water, even though CAFOs are legally not allowed to pollute in the first place.¹⁰⁶ The 2018 Farm Bill authorized \$1.7 to \$2.2 billion annually through 2023 for EQIP, and 50 percent of that funding is legally designated for livestock operations, including CAFOs.¹⁰⁷ We recommend removing the 50 percent set-aside of funding for CAFOs specifically; although growers would still be eligible, CAFOs should not be. The federal government should enforce environmental laws and use funds that would normally be spent saving CAFOs from lawsuits to advance regenerative agriculture instead.¹⁰⁸



Farmer Alyssa Barsanti cares for chickens on her farm, Magnolia Livestock, located on leased public lands owned by Pitkin County, Colorado.

Build More Meat Processing and Slaughtering Facilities Accessible to Regenerative Growers

The number of animal processors in this country has significantly declined in the past several decades, from around 10,000 in 1967 to about 850 livestock slaughterhouses in 2021.¹⁰⁹ As previously discussed, smaller-scale regenerative producers have an incredibly difficult time getting appointments at existing slaughterhouses.¹¹⁰ Farmers say that wait times can be up to six months long, and the slaughterhouse can be hours away.¹¹¹

In addition, the biggest agribusinesses tend to own both livestock and grain commodity farms, meaning that they benefit from federal subsidies on both sides of their production. As of 2020, the top four meat processors in the United States—which control more than 50 percent of all meat and poultry processing—also contract with farms that

benefit from federal grain and commodity subsidies and receive government grants to comply with environmental laws.¹¹² Furthermore, Rebecca Thislethwaite, director of the Niche Meat Processor Assistance Network, has repeatedly seen government funds used to keep the doors open for processing facilities that do not have viable long-term business plans.¹¹³

We need to limit government support going to the large slaughterhouses that primarily accommodate industrial CAFOs, and increase the number of small or midsize slaughtering and processing facilities.¹¹⁴ To achieve this, Congress can limit federal funding for large processing facilities and slaughterhouses and/or limit the number of federal grants that any single processing facility or slaughterhouse can receive. By limiting the federal funding that keeps large processing facilities open and the subsidies that artificially lower the price of meat, the federal government can encourage more competition in the processing and slaughtering business. It can instead use those federal funds to support the construction of additional federal small or midsize Food Safety Inspection Service-compliant and state-equivalent processing facilities and slaughterhouses for smaller-scale regenerative growers.¹¹⁵



Bigg Riggs Farm products are sold at the Farmer's Daughter Market Butcher Store in Capon Bridge, West Virginia.

does this grant program help farmers and ranchers layer additional enterprises into their existing business, adding financial security, but it also adds jobs in the agricultural economy.¹¹⁸ According to the USDA's Economic Research Service, farmers who received VAPGs were 71 percent less likely to have failed four years after receiving the grant.¹¹⁹

At its peak, the VAPG program was allocated \$40 million.¹²⁰ The 2018 Farm Bill, however, mandated only \$17.5 million for VAPG and authorized additional discretionary funding through the regular appropriations process.¹²¹ Funding for the program should be restored to historical levels. Furthermore, at least 10 percent of funding should be awarded to socially disadvantaged, beginning, veteran, and limited-resource farmers and ranchers.¹²²



California Center for Cooperative Development Cooperative Development Associate Mai Nguyen is ready to talk with people about the importance of local grains from this Torrance, California, farmers market.

they can easily be adapted to growers' needs.¹²⁴ Unfortunately, due to consolidation in agriculture, the number of farming cooperatives has declined in the past decade or so, from 2,475 in 2008 to 1,779 in 2019.¹²⁵

The USDA invests in cooperatives because they can improve economic conditions in rural areas.¹²⁶ The Rural Cooperative Development Grant Program (RCDGP) is a USDA program that provides funding to organizations and higher-education institutions to help them establish new farming cooperatives or to strengthen the services that existing cooperatives provide.¹²⁷ Within the RCDGP is a subgrant program called the Socially Disadvantaged Groups Grant (SDGG) that provides additional funding to organizations and higher-education institutions that offer cooperative services for socially disadvantaged farmers and ranchers.¹²⁸ Funding for the SDGG is capped at 20 percent of the total funding for RCDGP if the total funding for RCDGP exceeds \$7.5 million.¹²⁹ To encourage and support farmers and ranchers wishing to transition out of industrial farming and animal systems, Congress should increase total funding for the RCDGP and raise the SDGG cap.

Increase Value-Added Production Capacities for Farms

Value-added production involves transforming raw agricultural goods into something else, through processes like cleaning and cooling, packaging, distribution, cooking, combining, grinding, drying, handcrafting, spinning, or weaving.¹¹⁶ Value-added production enhances a farmer or rancher's products, which in turn increases their profits—strawberry jam is more profitable than plain strawberries. The Value-Added Producer Grant (VAPG) program is a USDA grant program, housed in the broader Local Agriculture Marketing Program (LAMP), that provides funding to farmers and ranchers to plan or construct value-added facilities on their operations.¹¹⁷ For example, a farmer could use a VAPG to construct a facility to turn strawberries into jam and bottle the jams for sale. Not only

Increase Funding for Farming Cooperatives

Farming cooperatives are farmer-owned businesses that aggregate produce and other goods from small farms and ranches, and they can also help farmworkers transition to farm ownership. By aggregating, small farms and ranches can increase their selling power, for instance by working together to secure larger government procurement contracts.¹²³ Farming cooperatives can also provide marketing services, value-added services like those discussed above, and equipment-sharing services and can help individual farmers collectively purchase inputs like seeds and compost, lowering their individual input costs. Agricultural cooperatives provide small and midsize farmers and ranchers an alternative model of organizing, purchasing, adding value, and selling their outputs, and because cooperatives are owned and run by growers,

Make Soil Health Projects Eligible for Water Resources Development Act Funding

The biannual Water Resources Development Act (WRDA) is the nation's largest water infrastructure investment bill. Implemented mainly by the Army Corps of Engineers, WRDA provides funding for reservoir repair and maintenance, flood mitigation projects, and feasibility studies for future water projects.¹³⁰ Healthy soil can increase natural water storage capacity, prevent topsoil erosion, and control flooding. Yet despite these water benefits, WRDA does not actively invest in building soil health.

Congress should pilot a project through WRDA that includes funds to build soil health in flood-prone areas on or near agricultural lands. Congress should also amend the definition of *natural or nature-based feature* to explicitly include soil as a natural resource worthy of restoration and protection using WRDA funds.¹³¹

Moving forward, Congress should look at how major pieces of legislation like WRDA can be leveraged to explicitly increase investments in soil health as a nature-based infrastructure. It should also actively encourage the Army Corps to invest in projects that build soil health as part of bolstering natural infrastructure across the country.

© Lynn Betts/NRCS SWCS



A tractor drags an old drill adapted to interseed cover crops among rows of corn seedlings on the farm of Bryce Irlbeck and his father Brian, in Carroll County, Iowa.

an overall lack of funds and absence of a comprehensive list that summarizes projects supported by the program, only a few states have taken advantage of their CWSRF financing to fund equipment and practices that transition land toward more regenerative management.¹³⁵ Without a comprehensive list of projects, states cannot learn from one another about what is possible under the CWSRF. Furthermore, the CWSRF prioritizes loans over grants; this structural barrier makes it difficult for smaller, nontraditional projects to apply because they do not have a recurring revenue stream that makes it easy to pay loans back.¹³⁶ Finally, even if states were to take advantage of this support, there is not enough funding within the CWSRF to support both critical water infrastructure upgrades and transitions to regenerative agriculture.

To improve the flow of CWSRF funding to regenerative agriculture, Congress should:

- Increase federal appropriations for the CWSRF to \$10 billion;
- Clarify and streamline guidance on the Green Project Reserve (GPR)—a set-aside in appropriations law requiring 20 percent of CWSRF funding to be used for green infrastructure, energy efficiency, water efficiency, and innovative projects—and publish a comprehensive list of projects funded through the CWSRF so that states can learn about agricultural projects elsewhere;
- Increase the proportion of CWSRF funding to be provided as grants from 10 percent to at least 20 percent so that all kinds of applicants can receive funding;
- Provide guidelines and technical assistance on how states can calculate cost savings from downstream impacts as revenue; and
- Clarify and publicize that funds can be used to support agricultural practices, transitions, and equipment purchases and integrate the EPA, Department of Energy, and USDA CWSRF technical assistance programs.

Improve the State Revolving Fund as a Resource for Regenerative Agriculture

The Clean Water State Revolving Fund (CWSRF) was created by 1987 amendments to the Federal Water Pollution Control Act (33 USC 1383).¹³² The CWSRF is a financial assistance program that helps fund a range of water infrastructure projects, including nonpoint source pollution control, water conservation and efficiency, and watershed pilot projects. The federal government provides funding to states, which then administer funds to projects, primarily through loans. States also provide matching funds.

The CWSRF can also be used to fund equipment that helps transition farms and ranches to regenerative systems upstream to reduce chemical runoff contamination downstream.¹³³ Washington State and Kansas have used their CWSRF monies to subsidize the cost of purchasing no-till equipment.¹³⁴ Unfortunately, due to factors including

FUNDING REGENERATIVE FARMING EQUIPMENT THROUGH THE STATE REVOLVING FUND

Since 1995, Washington State has been using portions of its CWSRF funding to support the purchase of equipment that helps transition farms to no-till.¹³⁷ From 1995 to 2017, Washington loaned more than \$18 million to the Spokane Soil and Water Conservation District. The district loaned those funds to farmers to help them purchase expensive no-till drills. The conservation district was able to repay its CWSRF loan to Washington State from farmers' loan repayments to the conservation district. According to the EPA, helping farmers offset the upfront cost of purchasing expensive no-till drills has reduced soil erosion in Spokane County by 90 percent, prevented 1.9 million tons of sediment and chemicals from entering the state's waterways, and converted 700,000 acres of farmland to no-till.¹³⁸ Not only has this saved the county and the state money on cleaning up downstream contamination, but farmers in Spokane County reported saving about \$13.50 per acre from reduced labor, fuel, and repair costs.¹³⁹



The Buffalo Farm to School program brings healthy, local, and fresh food to schools in Buffalo, New York. The initiative supports local farmers and food producers.

Increase Procurement From Regenerative Farms and Ranches

Every year, the federal government spends billions of dollars purchasing food through a process called procurement. The USDA, the Department of Defense, and the Department of Veterans Affairs account for most of the federal government's food procurement purchases. Theoretically, federal agencies should leverage their food purchasing powers to meet the nation's goal of reducing GHG emissions to 50 percent of 2005 levels by 2030.¹⁴⁰ In practice, however, several factors get in the way, including the lack of a national commitment to use federal procurement in support of regenerative agriculture, the lack of a centralized database to hold federal agencies

accountable for their procurement decisions, and a generally obscure application process that makes it difficult for regenerative farmers and ranchers to apply for federal procurement contracts.

Making the federal procurement process more accessible to small-scale, regenerative, and BIPOC producers would not only serve environmental goals but also enhance equity in food markets, enable producers to better manage their risk due to more stable and predictable revenue from procurement contracts, and encourage economic growth among these producers. Utilizing their purchasing power, governments can be a force for promoting climate stewardship and economic equity. The federal government should:

- Create targets that increase every year for purchases from regenerative farmers and underserved producers, including socially disadvantaged, beginning, and limited-resource farmers and ranchers. Procuring from certified organic growers offers one way for agencies to support regenerative farmers. However, some regenerative producers do not pursue organic certification, especially those who operate on a small scale or have limited resources, so federal procurement targets should also create markets for these producers. Another route for government procurement is the Intertribal Agriculture Council's Rege[N]ation program, which includes regeneratively grown products from Tribal Nations.¹⁴¹
- Create a centralized database that shows from whom the federal government procures food and the GHG emissions associated with those purchases.
- Develop an assistance program that helps socially disadvantaged, limited-resource, and beginning farmers and ranchers navigate the procurement contracts process.

Provide Regenerative Procurement Guidance to Public Institutions and Local Governments

Public institutions like schools, universities, and hospitals, as well as local or state governments, can also use their purchasing power to procure food from regenerative farmers and ranchers. Unfortunately, creating procurement policies and tracking successes can be complicated. The federal government should therefore develop a set of best practices and standards that public institutions and local and state governments can use to increase procurement from regenerative farmers and ranchers. These best practices should provide guidance on how to solicit input from community members and prioritize procurement from socially disadvantaged, limited-resource, and beginning farmers and ranchers.



North-South Institute, Inc. Executive Director Samuel W. Scott, Ph.D., and Farm Technician Alex Ramirez on Dave Borrowes' Epic Ranch, in Davie, Florida.

SUPPORT FARMERS AND RANCHERS

The number of U.S. farms has declined since the early 1970s, and, according to the 2017 USDA Census of Agriculture, the average age of a U.S. farmer keeps rising, signaling a career that is not attracting enough new talent.¹⁴² Additionally, the USDA's well-documented history of discrimination against farmers of color, especially through its farm loan programs, resulted in a concentration of wealth among white farmers and inequitable land access for first-generation and BIPOC farmers.¹⁴³ USDA's discriminatory practices prevented BIPOC growers from keeping and acquiring land and generational wealth, which further inhibited them from passing down land to future generations. Unfortunately, BIPOC growers still encounter institutional discrimination when trying to access financial support, perpetuating difficulties for these historically underserved growers.¹⁴⁴ Climate change, discriminatory practices, inequitable access to land and financial help, and an aging workforce add risks to an already difficult profession. Without a new generation of farmers, the future of agriculture in the United States looks uncertain. This is why it's more important than ever to support existing and aspiring farmers and ranchers through grant programs and mentorship opportunities, invest in a new generation of producers, and uplift historically marginalized farmers and ranchers with comprehensive policies.

Additionally, to transition to regenerative agriculture, farmers must invest in new infrastructure like fences and irrigation, build hoop houses, buy or build specialized equipment, introduce new and diverse crops, reintroduce animals to the land, and more. These investments are expensive in the short term but have long-term payoffs. State and federal grants (e.g., for fencing and cover crops) help offset the costs of transitioning individual aspects of farming operations, but regenerative farmers and ranchers need comprehensive support, including marketing assistance, debt relief, affordable health insurance, help with paying off their student loans, and enough income to pay themselves and their workers a fair wage while saving for retirement. The following policy recommendations are designed to have an environmental impact while also helping to ensure a thriving new generation of farmers and ranchers.

THE HISTORY OF INJUSTICE FOR BIPOC FARMERS

© USDA Photo by Lance Cheung



Institute of American Indian Arts (IAIA) 1994 Land-Grant Tribal College and University (TCU) Land-Grant Research Assistant Kyle Kootswaytewa irrigates rows of corn and checks on the health of corn and black tomato crops in the IAIA Demonstration Garden, in Santa Fe, New Mexico.

insurmountable cycle of debt.¹⁴⁹ Farmers of color have challenged these practices in court, and the cases show how policies and their implementation can create inequities in agriculture and further burden farmers and ranchers of color as they await reparations:

- *Pigford v. Glickman* was one of the first significant USDA discrimination case decided by the Supreme Court. The Court found that the USDA had engaged in discriminatory loaning and allocation practices that resulted in a disproportionate share of government benefits going to white farmers relative to the number of Black farmers who applied for these same benefits. The courts initially approved a settlement agreement in 1999 but did not address major concerns around the structure of the settlement for another 14 years.¹⁵⁰
- *Keepseagle v. Vilsack* followed the *Pigford* decision, with the Supreme Court similarly finding that the USDA had discriminated against Native American farmers and ranchers with regard to the allocation of loan program benefits since 1981. It took almost a decade after its filing in 1999 for the federal government and aggrieved parties to approve a settlement agreement to compensate class members for discrimination claims and make those funds available for debt forgiveness and tax relief.¹⁵¹
- *Garcia v. Vilsack* highlighted the USDA's discriminatory lending practices against Hispanic farmers and ranchers. Unlike the previous cases, the court here did not grant class certification. This decision forced Hispanic farmers and ranchers to settle their claims individually—a burdensome process—instead of settling the case as a class.¹⁵²

As a result of decades of discrimination by the USDA, Black, Indigenous, and Hispanic farmers have been shut out of federal programs that help with lending and land access. The history of land ownership among Black farmers, for example, highlights the severe consequences of a century of disinvestment. At its peak in 1920, about 14 percent of U.S. farmers were Black or African American.¹⁴⁵ In 2017, according to the most recent USDA Census of Agriculture, less than 2 percent of U.S. farmers were Black or African American.¹⁴⁶ As the number of Black farmers declined, so did the amount of land they owned, decreasing by 80 percent between 1910 and 2007.¹⁴⁷ It is therefore unsurprising that as of 2017, white farmers owned 94 percent of private agricultural land across the country.¹⁴⁸

As land ownership by farmers of color has declined dramatically over the past century, the amount of debt owed by farmers of color has skyrocketed. Fueled largely by the USDA's persistent failure to equitably distribute benefits to vulnerable farmer communities, many minority farmers have been corralled into a perpetual and

© Marissa Leshnov for NRDC



Leslie Wiser preparing a seeder for planting at Radical Family Farms in Sebastopol, California.

Create a Transition Program to Fund Comprehensive Investments in Regenerative Systems

One way to support regenerative agriculture is to provide direct support for farmers and ranchers to transition to more regenerative systems—for example, by bringing land under certified organic management or converting monoculture cropland into an integrated crop–livestock system. To get there, we need a single, comprehensive transition program that includes funding for regenerative farming practices, mentorship, infrastructure, market development, and hands-on technical support.

This transition program would differ from traditional conservation programs in taking a more holistic approach that supports farmers and ranchers throughout the challenging transition period and focuses on groups of



Farmer Julia Aguilar (left) and Seedkeeping apprentice Heidi Ratanavanich harvesting sorghum at Truelove Seeds farm in Glen Mills, Pennsylvania.

the impacts of specific practices, like natural pest control, application of compost, and use of hedgerows. In addition, the program could fund cooperative ownership of seed-cleaning equipment, grain silos and mills, certified-organic and small and midsize slaughterhouses, textile infrastructure for fiber producers, and community-owned kitchens for creating value-added products like jams and bread. The program should also include resources for community organizations and regenerative agriculture groups to facilitate participation, provide technical assistance, and promote local and regional marketing opportunities.

The program could be funded by an act of Congress, including the Farm Bill, or could be more quickly funded by redirecting and bundling existing USDA resources.

farmers who have been underserved by agricultural policy in the United States: farmers of color and those operating small and midsize farms, including beginning farmers and farmworkers who want to become owners. The program should aim to redress inequities by prioritizing funds for socially disadvantaged farmers; this could include a reparations subprogram that offers access to land, debt relief, and other resources for BIPOC farmers and ranchers. In addition, the USDA should identify underinvested regions in particular need of support, such as the South, and use regional strategies and federal procurement to grow markets for regenerative producers.

The program should include funding for on-farm research and technical support, and funding for investments in infrastructure, both on-farm and through the supply chain. Program resources could help producers cultivate regionally appropriate seeds and breeds and learn about



Old Gjerpen Farm Founder Richard Larson, left, talks about business, the basics of grading sheep, revealing the true hair color and the benefits of showing sheep in competition during From Service to Stewardship a two-day workshop in Remington, Virginia.

Continue Support for Socially Disadvantaged and Beginning Farmers and Ranchers and Tie Soil Health Education Into Programming

Congress created the Farming Opportunities Training and Outreach (FOTO) Program to train the next generation of farmers and ranchers and set them up for success. The program helps connect beginning, socially disadvantaged, and veteran farmers and ranchers with mentors, educational and research opportunities, business advisers, and technical assistance providers who can assist with grant applications and succession planning.¹⁵³ The projects funded by FOTO have a proven track record of success and are widely popular across the country.¹⁵⁴ Congress must continue supporting robust and permanent funding for the Farming Opportunities Training and Outreach Program.¹⁵⁵

Additionally, Congress should leverage these educational and mentorship opportunities to advance regenerative agriculture and soil health. Because of all its benefits, Congress should include soil health education and funding to measure soil health improvements into FOTO grants and prioritize awarding grants to organizations and projects that advance regenerative agriculture and build soil health.



Institute of American Indian Arts (IAIA) 1994 Land-Grant Tribal College and University (TCU) Land-Grant program Gardner Teresa Kaulaity Quintana (Kiowa) leads the gardening team, operations, instruction and outreach for all things related the campus demonstration garden and greenhouse, in Santa Fe, New Mexico.



Winfred Denson Jr. harvesting turnips in a high tunnel at a Choctaw Fresh Produce project farm on the Mississippi Band of Choctaw Indians Reservation in Mississippi.

Make Federal Conservation Program Funding More Accessible to BIPOC Farmers and Ranchers

USDA's conservation programs are the primary way that the federal government supports farmers and ranchers financially by offering to share the cost of implementing environmentally beneficial practices. The Natural Resources Conservation Service (NRCS) is the federal body within USDA that grants these funds to farmers and ranchers, allocating funds according to established NRCS practice standards and ranking tools.¹⁵⁶ Unfortunately, Indigenous agricultural practices are often left out of NRCS's practice standards.¹⁵⁷ NRCS should revise these standards to be more inclusive of practices used by Indigenous farmers and ranchers. It can start by appointing a committee to work with Indigenous producers to ensure that NRCS ranking systems and practice standards properly include Indigenous agricultural practices.

We also recommend allocating at least 10 percent of all federal conservation program funding to socially disadvantaged farmers and ranchers. This should include funding disbursed by EQIP and by the Regional Conservation Partner Program, another federal initiative that helps farmers implement conservation activities addressing specific natural resource issues in a state or region.¹⁵⁸

Create an Inclusive and Equitable Playing Field for Indigenous Regenerative Agriculture

Natural resources are held sacred in Indigenous communities, and their culture, economy, and spirituality are dependent on the vitality of these resources.¹⁵⁹ At the same time, because Indigenous tribes are separate entities and are not part of state jurisdictions, they rely heavily on federal funding. However, historically, tribes have had limited access to federal funding and have been ineligible for many Farm Bill programs because grant requirements do not recognize Indigenous farming practices, nor does the Farm Bill recognize the different land ownership regimes of tribes, such as collective ownership of land.¹⁶⁰ Tribes and Indigenous-led organizations have been advocating for a more inclusive and equitable agricultural playing field for Indigenous farmers and ranchers for a long time. While many improvements were made in the 2018 Farm Bill, there are still many more steps to take to equitably support tribal nations and Indigenous farmers and ranchers in advancing their food sovereignty and conservation initiatives.

Legislative language in the Farm Bill should include and recognize tribal customs and practices to guarantee Indigenous access to federal funding and eligibility for USDA programs. To allow greater tribal participation in Farm Bill programs, tribal self-governance should be expanded for many of the programs, which would enable tribes to manage and administer these benefits in a way that is tailored to the needs of their constituents. Additionally, authentic, broad, and diverse participation from tribal groups and organizations should be heavily considered in the design and implementation of Farm Bill legislation and programs. Measures to achieve this can include (but are not limited to) forming tribal technical committees, ensuring diverse regional representation, and recognizing Indigenous practices and traditional knowledge

as standards for land management and eligible for Farm Bill programs, as recommended by the Indigenous Food and Agriculture Initiative’s 2018 Farm Bill report.¹⁶¹

In addition to improving inclusivity and eligibility for Indigenous peoples in Farm Bill programs, we recommend both prioritizing Indigenous farmers and ranchers and tribal land for these programs and increasing overall funding for Indigenous agriculture. This can be addressed by establishing or increasing tribal set-asides in programs to ensure that a certain percentage of funds goes to Indigenous people. Measures can include (but are not limited to) increasing disaster assistance coverage, providing more cost coverage for conservation practices, or providing full advance payments of cost shares. Funding levels for Indigenous farmers and ranchers must also steadily increase over time.¹⁶²

There are many opportunities in the upcoming 2023 Farm Bill to ensure stable and adequate support for Indigenous agricultural communities to flourish, and we urge deep and authentic engagement with Indigenous stakeholders in the legislative process. The Biden–Harris administration’s America the Beautiful initiative, an effort to conserve and restore lands, waters, and wildlife across the nation, presents another opportunity to improve authentic engagement with tribal communities and ensure consistent and inclusive coordination with tribes across government agencies, including the USDA.¹⁶³ It will be critical for this initiative to outline accountability measures and best practices for engaging tribal communities before implementation.

HOW THE BLACKFEET NATION IS REGAINING ITS FOOD SOVEREIGNTY IN MONTANA

Food sovereignty is the right and ability of a community to design its own food system, create its agricultural and food policy, and set their own stewardship standards for what meat gets processed. Food sovereignty includes the right to healthy, culturally appropriate, and sustainably produced food.¹⁶⁴

In 2017 the Blackfeet Nation in Montana created an Agriculture Resource Management Plan (ARMP), in part to build, own, and operate its own meat processing facility.¹⁶⁵ Historically, the Blackfeet Nation, the largest tribe in the United States, has struggled with access to healthy, affordable, and culturally relevant foods. There are only two grocery stores on the tribe’s 1.5 million acres of homeland. Due in large part to poverty and widespread unemployment, 69 percent of those living on the Blackfeet Reservation are food insecure—more than five times the national average of 12.5 percent.¹⁶⁶ The first of its kind, the ARMP was written by the tribe and maps out a long-term strategy to address its food access issues. By constructing and operating their own processing plant, Blackfeet Nation ranchers will keep more money in their pockets and be better able to get their regeneratively raised meat to market. This local processing facility will create jobs, decentralize the meatpacking system, and enable tribal farmers and ranchers to save on processing costs typical of an out-of-state corporate facility. By creating infrastructure to provide a market for their regeneratively raised animals, the Blackfeet Nation is taking control of its food system and regaining its food sovereignty.¹⁶⁷

© Joseph Pecora



Cattle grazing on a Blackfeet Nation ranch in Montana.



Apprentices knock down a rye cover crop in preparation for planting.

Pilot a Program That Mimics the Civilian Conservation Corps and Expands it into Private Lands

The federal government should create a program that mimics the now expired Conservation Corps and expands it to include restoration projects on private agricultural lands. The program could connect farmers and ranchers with a civilian workforce to take on agriculture projects that increase biodiversity, restore critical wildlife habitat, increase carbon sequestration on working lands, and improve access to nature. For example, the federal government could collaborate with farmers and ranchers on projects to expand compost infrastructure and deliver compost, plant and harvest cover crop seeds, create prairie strips and pollinator habitats, and plant and maintain riparian buffers. FDR’s Conservation Corps built the nation’s parks; a similar program expanded to include private agricultural lands can help rebuild the nation’s food system, transform our agricultural landscape into a carbon sink, and strengthen the agricultural sector’s resilience to climate change.

Developing a highly skilled agricultural workforce will be critical. This kind of program can cultivate the next generation of growers, create good agricultural jobs for underemployed Americans, promote rural entrepreneurship and rural economic development, showcase the critical role that farmers and ranchers play in land stewardship and climate change mitigation, and ensure the longevity of our food system.



Young people examining plants at Soul Fire Farm, New York.

Recruit and Compensate More BIPOC Mentors and Mentees

In the face of a changing climate and an industry dominated by large agricultural players, farming and ranching can be especially difficult for those who are new to it or trying out new practices and techniques. Regenerative agriculture is built on Indigenous agricultural practices, and historically, BIPOC growers have contributed to many other modern practices that build soil health. Many BIPOC growers are at the forefront of regenerative agriculture and have been experimenting with and implementing these practices for years. Their experience and mentorship can guide beginning or transitioning farmers and ranchers in adopting regenerative practices.

and ranchers can share their experience and knowledge with beginning farmers. The USDA should increase funding to the New Farmer Mentorship program and recruit more BIPOC mentors and mentees. The USDA must also compensate mentors and mentees for their time. Funding mentors and mentees will help build a body of regional and technical experts ready to advise new farmers and ranchers. Recognizing and paying those who pass Indigenous knowledge down to future generations also acknowledges the importance of those practices in regenerating U.S. agriculture. Compensation would also help participants diversify their revenue stream.

The USDA’s volunteer-based New Farmer Mentorship program must be expanded so more BIPOC farmers



A soil conservation instructor from Hartnell College talking to a class of new, beginning, and existing farmers during a night seminar at the Agricultural Land Based Training Association (ALBA) in Salinas, California.

FUND REGENERATIVE AGRICULTURE IN RESEARCH AND EXTENSION

Research and extension provide technical resources to farmers and ranchers across the country and can be administered by entities including innovative colleges and institutions, land grant colleges' extension services, and USDA programs. Unfortunately, the dearth of region-specific and operation-specific technical resources on regenerative agriculture is a challenge for the regenerative movement, especially given that a basic principle of regenerative agriculture is to employ farming practices that are specific to one's microclimate and environment. Too often, when our interviewees sought information about a specific topic, like organic no-till agriculture in the Pacific Northwest or growing grapes in the Southeast, there was little to be found.

A conservation district is the local government component of the federal, state, and local government conservation delivery system.¹⁶⁸ It is both a geographic area and an entity, usually authorized by state law, governed by a board, and, if funding is adequate, staffed by local experts. Farmers and ranchers often lean on these experts for technical assistance in implementing projects that control erosion, improve soil health, and protect public lands, water quality, and biodiversity. Due to their regional focus, conservation districts can offer tailored services and expertise to farmers and ranchers within their boundaries. Many of our interviewees mentioned the resourcefulness of their local conservation district when experimenting with and transitioning to regenerative practices. Unfortunately, conservation districts are usually underfunded and understaffed.¹⁶⁹

There is also a great need for one-on-one mentorship and technical support tailored to the specific context of a farm or ranch.¹⁷⁰ Congress must provide additional resources for research, extension, and education so that regenerative farmers and ranchers get the help they need, including free, one-on-one, long-term consultation services and also pilot efforts to help farmers research, measure, and value the ecosystem services they provide.



Colorado farmer Brad Haynes, left, stands with an NRCS extension agent to discuss a recent experiment to plant a previously fallowed field with multiple species cover crop.

Assistance (CTA) Program and also through Farm Bill conservation programs.¹⁷² According to NRCS, the CTA program offers customized advice and information at no cost to producers.¹⁷³ In March 2021, more than 70 conservation and sustainable agriculture organizations requested that Congress provide \$1.1 billion for technical assistance through CTA.¹⁷⁴ With this type of increased funding, the CTA program could provide many more farmers and ranchers with the assistance they need to implement practices that align with regenerative principles.

Provide Consistent, Stable, and Adequate Funding for Conservation Districts and Increase Conservation Technical Assistance

According to the National Association of Conservation Districts, funding for conservation districts often comes from a few sources—property taxes, state funds, federal funds, private funds, fees for services or equipment, or grants from conservation organizations.¹⁷¹ However, local and state funds can be minimal or fluctuating and are often insufficient to fulfill the needs of the district and its constituents. We recommend increasing local, state, and federal funding for conservation districts to ensure that they have stable and adequate funding to provide technical support and assistance to their constituents.

Federal funding for conservation districts and federal technical assistance is delivered primarily through annual appropriations to the NRCS Conservation Technical



A farmer experiments growing wheat grains to turn into artisanal bread on a farm in Carbondale, Colorado.

Increase Funding for On-Farm Research

Regenerative farmers and ranchers are innovative and curious. They experiment on their fields to find the best mix of practices, seed types, livestock rotations, and soil amendments for their unique landscape. They observe closely, document thoroughly, and share their findings with other curious farmers and ranchers. On-farm research is a key ingredient of regenerative agriculture, important for developing techniques and solving problems.¹⁷⁵ We recommend increased funding for on-farm research, including for Conservation Innovation Grants and the Soil Health Demonstration Trial. This increased funding will enable more affordable and accessible soil health testing and analysis, through proven existing grant programs as well as private and nonprofit sector funding.¹⁷⁶

USDA's Sustainable Agriculture Research and Education (SARE) program is the USDA's only farmer-led research program focused on sustainable and regenerative agriculture research and education, including research to boost soil health and sequester carbon.¹⁷⁷ Congress authorized the program in 1990 and determined that it should receive at least \$60 million in annual funding; however, annual appropriations for the program haven't reached this level, according to research by the National Sustainable Agriculture Coalition.¹⁷⁸ Fully funding SARE is a simple way for Congress to support regenerative agriculture research every year in the appropriations process.



An earthworm in the soil of a no-till field.

Invest in Regional Grant Programs That Measure Outcomes With Holistic Indicators

Evaluating outcomes is important to discussions of environmental policy, but it is difficult to measure the outcomes of regenerative agriculture for at least two reasons. First, regenerative agriculture is not easily defined.¹⁷⁹ Second, as much as regenerative agriculture is identified by its principles and decision-making framework, it does not lend itself well to research that uses tightly controlled parameters to compare the outcomes of one system of farming with those of another. On-farm assessments that gather a combination of ecosystem outcomes would provide better data for assessing the impacts of regenerative agriculture than controlled, experimental research.

Regenerative farmers and ranchers measure success using holistic indicators: return of pollinators to the farm, good soil color, preservation of the land for future generations, staying in business in tough economic times, good conditions for farmworkers, clean air and water, and healthy crops for communities. Private, nonprofit, and public sectors should invest in small, regional grant programs that fund regenerative farming and ranching and evaluate outcomes on the basis of these types of holistic indicators. They might include ecological outcomes, like water quality and biodiversity, as well as economic and social outcomes, like improved mental health of farmers and ranchers and increased access to healthy food in underserved communities. Such a program would not need to start from scratch to develop indicators; one study identified 48 sustainability assessment tools and used four of those on Danish farms.¹⁸⁰

Pilot a Payment-for-Ecosystem-Service Program

Regenerative farmers and ranchers provide many ecosystem services that often go unseen or are undervalued. Developing programs to pay regenerative farmers and ranchers for their water conservation, biodiversity restoration, carbon sequestration, wetland management, flood mitigation, and water quality improvement efforts can help improve farm and ranch profitability and correctly value a healthy ecosystem and its services.¹⁸¹ Once government agencies properly account for the true cost of ecosystem services and its benefits, a payment-for-ecosystem-service (PES) program can encourage farmers and ranchers to adopt regenerative practices and provide them with an additional revenue stream.¹⁸² A PES program can pool funds from downstream beneficiaries of ecosystem services, such as governments or businesses, and offer those as incentive payments to participating farmers and ranchers.

A successful, equitable, and beneficial PES program must include the following parameters:

- A risk assessment using the best available science to identify regenerative practices that are most effective for a given region.
- An equitable engagement process that reduces barriers to participation (including barriers identified by Indigenous communities), prevents influence from large agribusinesses, and includes regenerative farmers and ranchers who were already providing ecosystem services prior to the implementation of the program.¹⁸³
- An assistance element that helps socially disadvantaged, limited-resource, and beginning farmers and ranchers navigate the PES program process.
- A business-as-usual baseline that includes peer-reviewed environmental data from the last five years to measure environmental improvements over time.
- An up-front payment to help farmers and ranchers implement regenerative practices.
- A standardized performance verification process that includes regular and accessible reporting from farmers and ranchers, periodic monitoring through field visits and satellite analysis (using consistent protocols established and regularly updated in line with the latest science), and verification procedures facilitated through third parties.
- A performance-based payment structure based on the verified data and improvements in the data over time.
- Educational programming that informs farmers about ecosystem service dynamics, regenerative practices, program requirements, reporting, and monitoring.

We recommend first piloting a PES program to verify its impacts, assess for any challenges, and identify opportunities to improve the program.¹⁸⁴

Conclusion

Farmers, ranchers, and scientists have spoken: Climate change is here, and its impact on agriculture is undeniable. We cannot continue our current trajectory of subsidizing industrial agriculture and practices that degrade soil health, pollute waterways, and harm biodiversity. Instead, we must transition our food and farming system toward one that fights these harms—a system that mitigates climate change, protects biodiversity, contributes to rural economic growth, and is more accessible to diverse farmers and ranchers. Thankfully, regenerative agriculture provides a framework to help our nation’s farmers and ranchers more easily adapt to future variability. The five basic principles of regenerative agriculture—nurture relationships within your ecosystem, understand your environmental and social context, reduce and eventually eliminate use of chemicals and fossil fuel–produced fertilizers, prioritize soil health, and nurture your communities—help strengthen farms and ranches from the ground up. We must thank the rich agricultural histories of BIPOC communities and the knowledge they’ve passed down through generations for showing us how regenerative agriculture can turn climate uncertainty into opportunities to build relationships, diversify, innovate, and once again find joy in agriculture.

By shifting federal investments in agriculture toward regenerative practices, decentralizing food systems infrastructure, supporting farmers and ranchers, and funding more regenerative agriculture research and education, the United States can start making meaningful investments in transitioning agriculture toward more regenerative systems. Through policy, we can reverse the “get big or get out” trend that catalyzed agriculture into a net emitter of greenhouse gases and instead reward farmers and ranchers for diversifying, for making management decisions based on their unique ecosystems, and for the relationships they build on and off the land.

This report’s policy recommendations are only the beginning of the transition; there is even more work to do to dismantle decades of discriminatory practices within the USDA that created inequities in agriculture, realign public dollars behind agricultural research for the public good, shift consumer choices toward less but better-quality meat, and make farming and ranching lucrative careers again.

While this report is written for those who work on policy, the farmers and ranchers we interviewed made it very clear that every person who eats has a role to play in advancing regenerative agriculture. From visiting a farm or a ranch and getting to know the people who grow your food, to asking your local supermarket to buy from local farmers, to calling elected leaders and advocating for policy changes, it will take all of us building our own connective threads for a regenerative food web to thrive.

© Courtesy of Soul Fire Farm



The farm crew and apprentices at Soul Fire Farm in New York.

Appendix A: Methodology

Interview Questionnaire

Using the guidance of an NRDC scientist trained in qualitative research methods and analysis, our team developed a standard interview questionnaire (reproduced in Appendix B). We asked staff from a few of the organizations we partner with to provide feedback on the questions. Once we finalized the questionnaire, our team used it as a script for our semi-structured interviews.¹⁸⁵ Interviewers used a conversational approach, varying the order of questions when appropriate; for example, if an interviewee touched on financial questions while discussing operational barriers, interviewers sometimes chose to jump to the financial section of the questionnaire and return to operational questions later. The questionnaire included broad thematic queries (e.g., “How would you describe the way you farm?” and “Why do you farm the way you do?”) and more specific queries (e.g., “Do you own the land you work on?”). The interviewer asked all or almost all of the questions in each section of the questionnaire. If an interviewee provided answers to multiple questions while responding to one, we did not ask those specific questions again. Further, if an interviewee was uncomfortable answering a question (e.g., revealing their specific acreage), we did not press for an answer. As a result, not every interviewee answered every question. However, the MAXQDA qualitative analysis software used to code the interviews helped track how many interviewees answered each question.

Finding Interviewees and Conducting Interviews

Three NRDC staff members served as interviewers, hereafter referenced as *core staff*. Semi-structured interviews were conducted from August 2019 to March 2020. Core staff were provided guidance on how to conduct those conversations from the same NRDC scientist who helped develop the questionnaire. That scientist has experience in qualitative research methods and conducting semi-structured interviews.

Core staff started the search for interview candidates by asking external partner organizations—California Climate and Agriculture Network, Illinois Stewardship Alliance, and Fibershed—for recommendations. Core staff also searched online, looked up the names of farms and ranches on farmers market lists around the country, asked interviewees for additional recommendations, met potential candidates at conferences—including the Southern Sustainable Agriculture Working Group Conference and the Chesapeake Alliance for Sustainable Agriculture Conference—and found additional farmers and ranchers via Facebook and Instagram. In the initial outreach to prospective respondents, core staff explained how we came across their name and farm or ranch, what NRDC is as an organization, the purpose of the research, and what we hoped to learn from them (i.e., the barriers and opportunities for scaling up regenerative agriculture). If the prospect agreed to be interviewed, core staff confirmed a date and time, and provided Zoom log-in information. Core staff also offered to share the questionnaire ahead of time; most interviewees took us up on that offer, but some did not.

One interviewee provided written answers to the questionnaire. The remaining 113 interviews were conducted via conference line or in person. Due to a technical error, one conversation was not recorded. In this instance, the interviewer immediately documented what could be remembered, but this interview was not analyzed. At the start of every Zoom session, core staff asked for verbal permission to record. At the end, core staff asked the respondent for the names of additional farmers or ranchers to reach out to. In total, core staff used 112 interviews as the basis for this report.

Core staff attempted to talk with at least two farmers or ranchers from every state and the District of Columbia, and we came close to that goal (only Utah, North Dakota, and Mississippi are not represented). We spoke with farmers and ranchers of all sizes and production systems (crop farming, 29; livestock ranching, 30; dairy, 4; livestock and dairy, 1; diversified, 48). While the questionnaire did not specifically ask for farmers’ and ranchers’ race, gender, age, or other personal information, core staff did speak with farmers who were Black, Indigenous, and people of color; with both women and men, including some who identify as LGBTQ+; and with people of various ages. There are some sampling biases in the study. First, our interviewees were self-selecting, in that many of them self-identified as regenerative, organic, or sustainable growers and were more likely than others to respond to questions about soil health and regenerative agriculture. Second, our study employed convenience sampling—recruiting interviewees by asking organizations and individuals we already knew, and by asking respondents for additional recommendations.

Transcription

Core staff exported all the interview recordings to Otter for transcription. If requested, core staff sent copies of the recorded interview or a transcript to the respondent. Once uploaded into Otter, core staff were joined by additional NRDC staff to check the transcripts for accuracy. We added punctuation where appropriate and deleted redundant words and filler phrases including *um*, *like*, and *ugh*. The transcripts were then uploaded into a qualitative analysis software tool, MAXQDA, for further analysis.

MAXQDA Analysis of Transcripts

Core staff uploaded 111 transcripts and the one written response into MAXQDA for a total of 112 interviews. Core staff then created a codebook, a manual that details and defines how the team categorized and labeled segments of transcripts. We developed the codebook in three phases. We first created codes that reflected the questions in the questionnaire. For example, we created a ‘description of how you farm’ code to capture how respondents described their operations and we created a ‘soil related practices’ code to collect the various practices interviewees used to build soil health. Second, after reading through a random sample of six transcripts, we noted where additional codes might be helpful and added them if all three team members agreed they were needed. Last, we consulted three additional NRDC staff and asked for feedback. Once the codebook was finalized, each interviewer coded three transcripts (for a total of nine) using the codebook. Core staff met as a team to confirm that we used the codes consistently across those nine transcripts.

During March 2020, core staff read through and coded all 112 transcripts, with each interviewer handling transcripts of interviews that they did not conduct. Core staff met every week to discuss any issues that arose during the coding process—including uncertainties about how to code particular transcript segments. In these instances, the team agreed on a code for that questioned segment and added information regarding the issue and its solution in the definition for that code. Meeting every week helped establish consistency in our use of the codebook.

Core staff used the frequency functions within MAXQDA to determine which issues were raised most often by interviewees. There were two elements to the frequency calculations: first, the total number of times a specific code was used across all transcripts, and second, the proportion of transcripts in which the code was used. For example, federal government policies were raised as a barrier more than 240 times across all 112 transcripts and was mentioned in 74 percent of the 112 interview transcripts. Core staff used these frequency functions to determine the four main themes that shaped Part 2 of this report and served as guideposts for our policy recommendations.

Policy Analysis

The next phase of our work involved a policy analysis. Core staff printed all the sections of transcripts that were coded (hereafter called *coded printouts*) from MAXQDA and individually read through the document. As each of us read through the coded printouts, we noted ideas that would address the issues raised by our respondents. For example, if an interviewee mentioned a complicated federal grant process that prohibited access to new fencing, we may have jotted down an idea to make the federal grant process easier for new fencing. There were sometimes multiple ideas proposed for the same issue. We created a master list for all the ideas the core staff came up with while reading the coded printouts. Not all ideas were policy related.

Core staff organized the master list of ideas into three buckets: changes to or support for existing policy; ideas that could be bolstered through policy but did not currently have a policy lever; and ideas that could be promoted or adopted by the private sector. Core staff focused the next phase of research on the first and second categories, which contained a total of 80 ideas.

Core staff gathered more information on the 80 policy proposals and ran them through a policy matrix. The policy matrix helped analyze and score the 80 ideas against a set of criteria, including how realistic the idea was; whether the idea addressed issues that were consistently mentioned in our interviews; whether it would help achieve our team’s water and climate goals; whether NRDC had the expertise to advocate for the idea; and whether the idea promoted diversity, equity, and inclusion in agriculture. The 80 proposals were divided among the three core staffers for research and scoring according to each criterion. Core staff designated a “low,” “medium,” or “high” score based on how well the proposal met the criterion. Except for one criterion, “high” cells were colored green, “medium” cells yellow, and “low” cells red. For the “financial burden” criterion, “low” was colored green and “high” was red. To calculate scores, green cells were awarded three points, yellow cells two points, and red cells one point. The 25 ideas with the highest scores became the ones discussed in this report. These 25 recommendations were also bolstered by the frequencies calculated through MAXQDA, the same frequencies that helped shape the four major themes from the interviews.

The list of criteria and an example of the scoring matrix for five ideas are provided in Appendix C.

Publication Process

The quotes included in Part 1 were all pulled from transcripts of interviews with the named interviewees. Staff sent a copy of the quote to the interviewee, asking for permission to include it in the report and inviting the interviewee to edit the quote for greater clarity if desired.

Before publishing the report, core staff reached out to all their interviewees and requested permission to list them in the Acknowledgments section. Those who gave permission are listed.

Appendix B: Questionnaire

BACKGROUND

1. Name
2. Farm/Ranch Name
3. Where
4. Tell us more about your operation.
5. What do you grow/produce?

PERSONAL

Thematic Question: How would you describe the way you farm? Why do you farm the way you do? Why do you choose some practices over others?

6. How long have you been farming/ranching? Are any of your family members farmers?
7. What inspired you to get involved in agriculture?
8. What factors influence how you farm natural resources?
9. Have you always farmed the same way? If not, why did you change your practices?

OPERATIONAL

Thematic Questions: What technical challenges make it difficult or risky to implement soil-building practices on your farm/ranch? What technical resources could help you overcome those challenges?

10. What soil-building practices do you implement on your farm? Do you implement each soil-building practice consistently or sporadically (depending on weather, finances, crop rotations)?
11. Are you no-till or minimal-till?
 - a. If so, how do you control weeds?
 - b. Do you use synthetic pesticides and/or fertilizers? For what? How often, in what circumstance, and for what reason?
12. What soil-building practices do you want to integrate onto your farm but haven't been able to yet?
 - a. What prevents you from adopting those soil-building practices?
 - b. Probing follow up question: Are any of the reasons due to difficulties getting the right equipment or infrastructure? Please explain. Is that equipment you could rent or share with another farm or ranch?
13. Do you contract/produce for a larger agribusiness? If so, can you talk about how those contracts encourage or inhibit investments in healthy soil?
14. Does anyone advise you on soil-building practices?
15. What is your farm's/ranch's average soil organic matter percentage?

MARKET

Thematic Questions: How do you choose where, when, and to whom to sell your goods? Why did you make that decision? What changes would you like to see in the ag marketplace?

16. How do you currently sell your products? To whom? [What are your typical market pathways: direct to consumers, wholesale, co-op, institutional, etc.]

17. Do you have to go off-site to process any of your goods? Can you share your experience with processing?
18. Do you use any labels that reflect your farming practices?
19. Are you certified organic?
 - a. If so
 - i. How long?
 - ii. What do your organic inspectors ask you about regarding maintaining/improving soil?
 - b. If not, why not?
20. What would make it easier to market your regeneratively grown products?

COSTS

Thematic Questions: What are some of the biggest financial decisions you make for your farm every harvest/year?

21. What have been your greatest financial challenges? Greatest successes?
22. Do you own the land you work on?
 - a. If you lease, how long is your lease?
 - b. How does your landowner influence the way you farm? Please explain.
 - c. If you are leasing land, are there any practices that you aren't doing that you would normally implement if you owned the land? What are those practices?
23. Do you get financial or business advice from anyone?
24. What are ways that you plan to keep your business stable when faced with uncertainty in climate, markets, crops, land tenure?
 - a. Have soil-building practices helped mitigate some of the uncertainties you face as a farmer? Please explain.
25. Do you see a return on your investment for soil-building practices? How do you measure those returns (e.g., soil testing, soil feel, yield, plant health, water infiltration)? How long do you think it will take for your soil-building investments to pay off?
26. How do you finance soil-building practices? Have you participated in any state or federal conservation incentive programs?
 - a. How was that experience? How did you hear about that outside funding?
 - b. What would you change about those incentive programs to benefit your farm and build healthier soil?
 - c. Will you continue implementing soil-building practices without a financial incentive/assistance?

CULTURAL

Thematic Questions: Are there any external threats to the success of your farm? Do you have a community to reach out to in case you have questions or need additional information?

27. Do you have a community of growers who support you as you experiment with new practices?
28. How do you measure your success in adopting regenerative practices?

MISC.

29. Who else do you recommend we talk to?
30. Is there anything else you think we should know?

Appendix C: Policy Analysis Criteria and Matrix

The following section explains the criteria used in the policy matrix.

Realistic

Is there a clear policy lever to address the barrier/opportunity? Can we articulate a theory of change for the idea?

Scalable

Can the idea be replicated across states?

Consistency

Does the idea address something that came up consistently in our interviews?

Benefit to Farmers

Do farmers and ranchers benefit from the idea? Who are the winners and losers if the idea is successful?

Financial Burden

Do farmers and ranchers bear the financial burden of implementing the proposal?

Impact on Farming Practices

Does the idea have a direct or indirect impact on farming practices? Does the proposal help farmers and ranchers change their behavior/decisions about land management?

Water Goals

Does the idea improve water quality and water conservation?

Biodiversity Goals

Does the idea improve biodiversity?

Climate Change Goals

Does the idea mitigate climate change? Does the idea help build resiliency against climate change?

Breaking Consolidation Goals

Is the idea vulnerable to manipulation? Does it favor corporate agribusiness over independent farmers? Does the policy give more power to the already powerful? Or does the proposal have the potential to put more power in the hands of farmers and ranchers? Does the idea help decentralize the agricultural supply chain?

Value Add by NRDC

Can NRDC add value to the proposed policy/research option, or are there enough nonprofit or local actors already in the space? Does NRDC's strengths as a public advocacy organization lend a new voice to the issue? Can NRDC's participation/advocacy of the proposal help engage new audiences on the proposal? Is NRDC the right messenger for this proposal?

Partnerships

Is there potential to either strengthen an existing partnership or build a new one? Is any partnership going to help NRDC bring an unlikely ally to the table? Is the potential partner credible (in its community and in its own advocacy)? Does the partnership include reaching out to 15- to 30-year-olds? Can the partnership help us scale up our research/advocacy? Outside of external partnerships, does this proposal allow a new internal NRDC partnership? Is the idea something already vetted by our partners?

Diversity, Equity, and Inclusion (DEI) Goals

Does the idea promote diversity, equity, and inclusion? Does it uplift and empower BIPOC farmers and ranchers? Does it increase representation of underrepresented groups/communities/people? Does it help break down barriers that prevent the full participation of socially disadvantaged groups? Does it help communities feel welcomed or respected or part of a collective purpose?

Operational Feasibility

Does the option require substantial staff time? Do staff have existing funding for implementing the proposal? Do we think the proposal will get institutional support?

Political Feasibility

Is the political climate ripe for this issue? Are there existing legislative champions for this idea? How likely are we to get public support for our work? Do we have a strong case against any opposition?

Analysis

The policy analysis matrix assesses each of the policy suggestions based on the criteria listed above. Each is assigned a "low," "medium," or "high" rating, indicated by red, yellow, or green shading, respectively. The ratings are given according to how strongly the criterion correlates or relates to the policy proposal. For example, a "high" rating on Partnerships means the policy idea provides a strong pathway for NRDC to strengthen existing partnerships or build new ones.

Example of Matrix

Criterion	Policy Idea				
	Continue Support for Senator Booker's CAFO Bill	Leverage State Revolving Fund to Support Transitions to Regenerative Agriculture	Tie Soil Health Improvements to Other Forms of Insurance	Increase Funding for Agricultural Cooperatives	Increase Farm Bill Funding for Indigenous Regenerative Agriculture
Realistic	HIGH	HIGH	MEDIUM	HIGH	MEDIUM
Scalable	HIGH	MEDIUM	HIGH	HIGH	HIGH
Consistency	HIGH	MEDIUM	MEDIUM	HIGH	MEDIUM
Benefit to Farmers	HIGH	HIGH	HIGH	HIGH	MEDIUM
Financial Burden	LOW	LOW	MEDIUM	MEDIUM	LOW
Impact on Farming Practices	HIGH	HIGH	HIGH	LOW	HIGH
Water Goals	HIGH	HIGH	HIGH	LOW	HIGH
Biodiversity Goals	HIGH	HIGH	MEDIUM	LOW	HIGH
Climate Change Goals	HIGH	HIGH	HIGH	MEDIUM	HIGH
Breaking Consolidation Goal	HIGH	MEDIUM	MEDIUM	HIGH	MEDIUM
Value Add by NRDC	HIGH	MEDIUM	HIGH	HIGH	MEDIUM
Partnerships	MEDIUM	HIGH	HIGH	HIGH	MEDIUM
DEI Goals	MEDIUM	LOW	MEDIUM	HIGH	HIGH
Operational Feasibility	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Political Feasibility	HIGH	MEDIUM	MEDIUM	HIGH	MEDIUM
COUNT	Green – 13 Yellow – 2 Red – 0	Green – 8 Yellow – 6 Red – 1	Green – 7 Yellow – 8 Red – 0	Green – 9 Yellow – 3 Red – 3	Green – 7 Yellow – 8 Red – 0

Appendix D: Descriptions of Practices

Agroforestry: An Indigenous practice wherein growers integrate trees and shrubs into crop and animal systems. This practice, which mimics forest systems, helps multiple species benefit from one another.

Animal integration: The practice of using land for both animals and crop systems, usually with the animals in carefully managed grazing rotation, rather than producing plants and animals separately. Animals stimulate soil biology while trampling on grasses and add organic matter to the soil with animal manure.

Animal welfare: The practice of prioritizing the health and well-being of animals being raised.

Composting: The natural process of turning waste (from manure or food) into fertilizer that can improve soil health.

Conservation buffer: The practice of planting permanent vegetation in small areas of land around a field or farm to prevent soil erosion, protect and enhance soil quality, prevent air and water pollution, and improve wildlife habitat.

Contour planting: The planting of crops in a pattern around a hill instead of up and down the hill. Following the natural contours of a landscape helps slow water flow during a rain event and reduces erosion.

Cover cropping: The planting of vegetation that keeps soil covered to reduce soil erosion, increase water retention, improve soil health, increase biodiversity, and more. Cover crops can be planted around the time of harvesting cash crops or in between rows of permanent crops.

Diversified cropping: Raising a variety of crops alongside one another in order to protect against pests and diseases, provide a diversified income stream and habitats for pollinators, and improve soil health. Many Indigenous farmers have grown diverse crops alongside one another for centuries. Perhaps the most widely known example is the “three sisters” technique of growing corn, legumes, and squash together.

Hedgerow: A type of conservation buffer consisting of a line of shrubs or trees around a cropping system. It acts as habitat for beneficial insects and other organisms and also serves as a windbreak.

Intensively managed grazing, also known as intensive rotational grazing: An Indigenous practice that mimics the way large animals move in herds across grasslands. This method of grazing moves livestock between pastures on a regular basis to improve soil fertility and allow pasture grasses to regrow.

No-till farming: A technique that leaves the soil intact when planting rather than disturbing the soil through plowing.

Pasture cropping: Planting annual species on perennial grassland to keep soil covered as the perennial species enters its dormant phase.

Perennial planting: Use of plants that do not need to be replanted every year. The plants exhibit long root systems that can retain water, improve soil’s porosity, sequester and store carbon, and improve soil health.

Planting native species: Species that are endemic to a specific area. Native plants are beneficial in restoring wildlife habitat and improving biodiversity, and they can be planted as the main cash crop, incorporated in conservation buffers, or used as cover crops.

Prairie strips: The practice of planting a strip of land 30-120 feet wide around or through a field planted with native grasses and flowers to reduce soil erosion, improve water quality, and provide wildlife habitat.

Reducing or eliminating pesticides or fossil fuel-produced inputs: An approach to managing pests that relies on building soil health and leveraging other natural systems instead of relying on pesticides or other dangerous chemicals.

Riparian buffer: A type of conservation buffer consisting of a vegetated zone near a stream. It serves as habitat to many beneficial organisms, protects water quality, and mitigates flooding.

Silvopasture: A form of agroforestry that integrates trees into pastures for grazing animals.

Solar panels on farms/ranches: The use of solar energy from panels to reduce dependence on fossil fuel and overall energy costs.

Appendix E: Illustrations of a Regenerative Farm's Climate and Water Cycles



REGENERATIVE AGRICULTURE & CLIMATE

- ① **Purchasing Foods from Local Regenerative Farms** is one way to reduce overall transportation-related greenhouse gas emissions in the food system.¹
- ② **Composting**, the process of turning food and other waste products into soil, reduces the use of fossil fuel-produced fertilizers. Composting also helps avoid the methane emissions from that waste degrading in landfills.²
- ③ **Solar Panels** reduce a farm's use of fossil fuel-produced energy.³
- ④ **Plants**, through photosynthesis, pull carbon from the atmosphere.⁴
- ⑤ **Trees**, including those planted for agroforestry or silvopasture purposes, pull and store carbon from the atmosphere and emit oxygen.⁵
- ⑥ **No-till Planting Equipment** keeps more carbon in the ground by eliminating the tillage practices that would normally release carbon from the soil.⁶
- ⑦ **Farm Equipment**, like no-till planters, often uses diesel, which emits greenhouse gases.⁷
- ⑧ **The plant matter left** on a field after mowing down a field of cover crops, as in this example, releases greenhouse gases into the atmosphere, but the plant matter left behind recycles nutrients back into the soil, which helps farmers avoid adding fossil fuel-produced fertilizers. Furthermore, cover crops pull carbon from the atmosphere and, depending on the type of cover crop, can also pull nitrogen from the atmosphere. A field of cover crops also improves soil structure and prevents nitrate leaching and excess nitrates from running off the farm.⁸
- ⑨ **Soil Microbes** respire, which releases carbon into the atmosphere.⁹
- ⑩ **Soil Testing** helps farmers measure the available nutrients in the soil and the soil's organic matter—which is a proxy measurement for stored carbon. Soil testing can help farmers and ranchers reduce their overall use of fossil fuel-produced fertilizers.¹⁰
- ⑪ **Animals emit methane into the atmosphere and leave manure**, a natural fertilizer, in the soil, which supports a robust soil microbiome that, in turn, helps recycle nutrients more efficiently. An active soil microbiome also helps reduce a farmer's or rancher's use of fossil fuel-produced fertilizers.^{11,12}
- ⑫ **Raising animals on pasture** has the added benefit of reducing the amount of feed a farmer or rancher would have to import, thereby reducing GHG emissions in the food system.¹³
- ⑬ **Plants** like the beans and other legumes found in the Three Sisters planting technique pull nitrogen from the atmosphere and can store that nitrogen in the soil for future plants to use, which can reduce a farmer's use of fossil fuel-produced fertilizers.¹⁴



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Illustration: Queenbe Monyei



Climate Mitigation



Climate Emissions



REGENERATIVE AGRICULTURE & THE WATER CYCLE

- ① Healthy soil is rich in microbes, earthworms, and organic matter, and it has good structure and improved porousness, thereby **increasing the soil's ability to absorb and store water.**¹
- ② Water moves slowly through healthy soil and **infiltrates well due to good structure** and improved levels of organic matter.²
- ③ After infiltration through healthy soil, harmful chemicals are absorbed into soil surfaces and retained, or broken down by soil microbes and removed, so that they are often filtered out of rain and irrigation water before reaching the groundwater for recharge. Groundwater recharge is the process in the water cycle that replenishes the water table from water that has infiltrated down through the soil surface from rainwater and irrigation water. Healthy soil means **less water is lost to runoff and evaporation and there is more water for recharge to replenish aquifers.**³
- ④ Chemicals like nitrates from fertilizers are known to contaminate well water near agricultural areas, but healthy soils on regenerative farms can **filter out these contaminants, resulting in cleaner drinking water for nearby communities.**⁴
- ⑤ On-farm natural water storage in ponds and healthy soil makes **farms more resilient during times of drought.**⁵
- ⑥ **Runoff from regenerative farms is cleaner when it reaches nearby streams,** due to reduced soil erosion and fewer chemical contaminants. Practices like cover crops and reduced tillage maintain the soil's structure and keep living roots in the soil, so that it stays in place rather than eroding into surface water.⁶
- ⑦ As climate change brings more extremes of droughts and floods and disrupts seasonal precipitation patterns, healthy soil as a result of regenerative farming **retains water from precipitation for a more sustained period, making farms and ranches more resilient to drought and flood.**⁷
- ⑧ Regenerative farmers and ranchers **maintain or restore the natural ecosystem in areas between land and waterbodies** called riparian zones, which provide habitat for wildlife, reduce farm runoff, and prevent excess sediment, chemical contaminants, and water from reaching the water.⁸
- ⑨ Wetlands are crucial habitat for wildlife and they also play an important role in the water cycle, **filtering out excess nutrients before they reach surface water.**⁹
- ⑩ Harmful algal blooms (HABs) kill fish and aquatic life and can make water unusable for drinking, fishing, and swimming, but regenerative agriculture can **help reduce pollution from farm runoff that contributes to HABs.**¹⁰
- ⑪ Rainwater flows overland into surface waters; rivers flow to the ocean where the water eventually cycles back into the atmosphere through evaporation. Healthier soil and regenerative agriculture **help ensure that clean water cycles efficiently** throughout the process.¹¹

References: 1. <https://soil.copernicus.org/articles/1/665/2015/soil-1-665-2015.pdf> pg 672 and 674 2. <https://soil.copernicus.org/articles/1/665/2015/soil-1-665-2015.pdf> pg 674 3. <https://soil.copernicus.org/articles/1/665/2015/soil-1-665-2015.pdf> pg 674 4. <https://www.mdpi.com/2071-1050/13/4/2400> pg 2 5. <http://www.fao.org/land-water/water/water-management/water-storage/en/> 6. <https://soil.copernicus.org/articles/1/665/2015/soil-1-665-2015.pdf> pg 678 7. <https://www.ucsusa.org/resources/turning-soils-sponges> 8. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/?cid=nrcs143_014199 9. <https://www.tandfonline.com/doi/full/10.1080/21513732.2015.1006250> 10. <https://www.nrdc.org/experts/lara-bryant/how-healthy-soil-can-help-reduce-harmful-algal-blooms> 11. <https://soil.copernicus.org/articles/1/665/2015/soil-1-665-2015.pdf>

Illustration: Queenbe Monyei

Appendix F: Summary of Policy Recommendations

This recommendation summary is organized in an order similar to the one used in the main text of this report but does not use the same section headings because some sections included more than one recommendation. It is intended as a useful, quick reference for policymakers.

Policy Idea	Acting Authority/Implementing Authority
Good Stewardship Discount—Provide a performance-based crop insurance discount to adjust insurance rates for practices proven to reduce risk of crop failure.	USDA: Act under existing authority. Congress: Direct USDA to act. Congress (alternative): Provide funding for a state-based pilot program or nationwide program that offers savings on premiums, rather than adjusting rates.
Whole-Farm Revenue Protection—Invest in staff training and resources to increase awareness and participation in the program.	USDA: Increase staff training and resources for WFRP under existing authority.
Reduce and Reform FCIP Subsidies—Eliminate yield-exclusion provision, reduce subsidies that don't provide conservation benefit, apply income caps for eligibility, expand conservation compliance provisions.	Congress: Reform FCIP and reduce subsidies in the next Farm Bill.
FCIP Savings Used to Fund Regenerative Agriculture—Create a mechanism to use crop insurance savings from risk-reducing practices to fund more farmers and ranchers transitioning to regenerative agriculture.	Congress: Create pilot program through Farm Bill process.
Create More Risk Management Options—Amend USDA Disaster Assistance Programs to reward farmers and ranchers who participate in conservation programs.	Congress: Amend through Farm Bill or through periodic disaster supplementals.
Increase baseline funding for conservation programs.	Congress: Authorize an increased level of baseline funding through Farm Bill or reconciliation; appropriate full conservation spending on authorized level through annual appropriations.
Increase funding for conservation reserve program.	Congress: Increase acreage cap and authorized funding through Farm Bill, and fully fund through annual appropriations process.
Limit expansion of animal feeding operations and help farmers transition out of CAFO systems.	Congress: Pass Farm System Reform Act.
Pass legislation to make large agribusinesses responsible for paying for compliance requirements for CAFOs.	Congress: Pass new legislation to hold large agribusinesses, rather than operators, responsible for preventing pollution from CAFOs.
Eliminate federal funding for CAFOs in Farm Bill conservation programs.	Congress: Amend Farm Bill language requiring 50 percent of EQIP funding to go to livestock; insert language in Farm Bill to eliminate funding of CAFOs through conservation programs.
Build more meat processing and slaughtering facilities accessible to regenerative farmers; limit subsidies to large slaughterhouses.	Congress: Limit federal funding for large processing facilities; limit the number of federal grants any single facility or slaughterhouse can receive.
Increase value-added production capacity for farms.	Congress: Increase funding for Value-Added Producer Grant program through annual appropriations and Farm Bill; set aside at least 10 percent of funding for underserved producers and create an additional set-aside for tribal applicants.
Increase funding for farming cooperatives through USDA programs.	Congress: Through Farm Bill, increase funding for Rural Cooperative Development Grant Program and raise the cap for Socially Disadvantaged Groups Grants.

Policy Idea	Acting Authority/Implementing Authority
Include soil health projects as eligible for Water Resources Development Act funding.	Congress: Pilot a project through WRDA that includes funds to build soil health in a flood-prone area on or near agricultural lands, and amend definition of nature-based feature to explicitly include soil.
Use State Revolving Fund as a resource for regenerative agriculture.	Congress: Increase federal appropriations for the Clean Water State Revolving Fund to \$10 billion; create a minimum requirement for 20 percent of CWSRF funding to be provided as grants. EPA: Clarify and streamline the Green Project Reserve guidance and publish a comprehensive list of projects funded through CWSRF; provide guidelines and technical assistance for states to calculate cost savings from downstream impacts; clarify and publicize that funds can be used to support agricultural practices, transitions, and equipment purchases; and integrate the EPA/DOE and USDA CWSRF technical assistance programs.
Increase federal procurement from regenerative farms and ranches.	Federal Acquisition Regulatory Council: Create targets for food procurement that increase every year for food purchased from regenerative farmers and ranchers and underserved producers; create a centralized database that tracks the GHG emissions associated with current and potential food procurement contracts; and develop an assistance program that helps socially disadvantaged, limited-resource, and beginning farmers and ranchers navigate the procurement contracts process.
Provide regenerative procurement guidance to local governments.	USDA: Develop best practices and standards for state and local governments to increase procurement from regenerative farmers and ranchers.
Create a transition program to fund comprehensive investments in regenerative and certified organic agriculture.	Congress: Pass legislation through Farm Bill, or by redirecting and using existing USDA resources, or through annual appropriations.
Continue support for socially disadvantaged and beginning farmers and ranchers in Farming Opportunities Training and Outreach Program.	Congress: Fund robustly through appropriations and increase Farm Bill funding; include soil-health education and measurements in FOTO grants.
Make federal conservation program funding more accessible to BIPOC farmers and ranchers.	USDA NRCS: Revise practice standards to be more inclusive of practices used by Indigenous farmers and ranchers; appoint a committee to work with Indigenous producers to ensure that ranking systems and standards are inclusive. Congress: Allocate at least 10 percent of all federal conservation program funding to socially disadvantaged farmers and ranchers through Farm Bill.
Improve access to Farm Bill programs for Indigenous people.	Congress: Include language in Farm Bill to recognize tribal customs and practices; increase overall funding for Indigenous farmers and ranchers and tribal land throughout Farm Bill programs. USDA: Include tribal groups and organizations in Farm Bill program design and implementation.
Pilot a program that mirrors the Civilian Conservation Corps and expands it to private agricultural lands.	Congress: Pass legislation to authorize and fund a new CCC including restoration projects on farm and ranch land.
Recruit and compensate BIPOC mentors and mentees in USDA New Farmer Mentorship program.	USDA: Increase funding to New Farmer Mentorship program and recruit more BIPOC mentors and mentees; compensate mentors and mentees for their time through existing funding.
Provide consistent, stable, and adequate funding for conservation districts.	Congress: Authorize \$1.1 billion for WRDA conservation technical assistance through federal appropriations process.
Increase funding for on-farm research through the Soil Health Demonstration Trial and USDA's Sustainable Agriculture Research and Education program.	Congress: Through annual appropriations, fully fund SARE program at the \$60 million level that has already been authorized. Congress: Through the Farm Bill, authorize \$100 million in annual funds for the Soil Health Demonstration Trial.
Invest in regional grant programs that measure outcomes with holistic indicators.	Congress: Authorize a pilot regional grant program and direct it to measure and report outcomes with holistic indicators.
Pilot a payment-for-ecosystem-service program.	Congress: Pass legislation authorizing a program.

Appendix G: Glossary

Beginning Farmer or Rancher: Someone who has materially and substantially participated in the operation of any farm or ranch for no more than 10 years. For statistical purposes, the USDA Economic Resource Service defines a *beginning farm* as one on which all operators are beginning farmers.

Carbon Sequestration: According to the U.S. Geological Survey, “the process of capturing and storing atmospheric carbon dioxide. It is one method of reducing the amount of carbon dioxide in the atmosphere with the goal of reducing global climate change.”¹⁸⁶ Soil carbon sequestration captures and stores carbon dioxide in soil. According to the United Nations Food and Agriculture Organization, “There is a major potential for increasing soil carbon through restoration of degraded soils and widespread adoption of soil conservation practices.”¹⁸⁷

Certified Organic: A labeling term that requires third-party certification of compliance with National Organic Program standards.¹⁸⁸

Confined Animal Feeding Operation (CAFO): An animal feeding operation that raises animals in confinement. CAFOs are a subset of animal feeding operations and are distinguished by their large size or their designation as significant polluters of surface waters. CAFOs are also facilities where animals are fed mainly corn and soy and are confined on a surface other than pasture or vegetated ground.

Industrial Agriculture: The large-scale, intensive production of crops and animals, often involving chemical fertilizers on crops or the routine, harmful use of antibiotics in animals as a way to compensate for filthy conditions, even when the animals are not sick. It may also involve crops that are genetically modified; heavy use of pesticides; and the use of other practices that deplete the land, mistreat animals, and increase various forms of pollution.

Limited-Resource Farmers or Ranchers: Farm households with low farm sales and low household income for two years in a row. In fiscal year 2020, low sales was defined as direct or indirect gross sales of \$180,300 or less. Low household income was defined as income falling below the national poverty level for a family of four with two children, or less than half of the county median household income.¹⁸⁹

Regenerative Agriculture: A land management philosophy whereby farmers and ranchers grow food and fiber in harmony with nature and their communities.

Socially Disadvantaged Farmer or Rancher: According to the USDA, farmers and ranchers belonging to groups that have been subject to racial or ethnic prejudice, including those who are Black or African American, American Indian or Alaska Native, Hispanic or Latino, and Asian or Pacific Islander. For some but not all USDA programs, this category also includes women.¹⁹⁰

Value-Added Production: The transformation of raw agricultural goods into consumer products through processes like cleaning and cooling, packaging, processing, distribution, cooking, combining, grinding, drying, handcrafting, spinning, or weaving.

Appendix H: List of Acronyms

ACEP: Agricultural Conservation Easement Program
BIPOC: Black, Indigenous, and People of Color
CAFO: Confined Animal Feeding Operation
CCC: Civilian Conservation Corps
CCRP: Continuous Conservation Reserve Program
CRP: Conservation Reserve Program
CSA: Community-Supported Agriculture
CSP: Conservation Stewardship Program
CTA: Conservation Technical Assistance Program
CWSRF: Clean Water State Revolving Fund
ECP: Emergency Conservation Program
ELAP: Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish
EPA: U.S. Environmental Protection Agency
EQIP: Environmental Quality Incentives Program
ERS: Economic Research Service
FCIP: Federal Crop Insurance Program
FSA: Farm Service Agency
FSRA: Farm System Reform Act
LFP: Livestock Forage Disaster Program
LIP: Livestock Indemnity Program
NACD: National Association of Conservation Districts
NAP: Noninsured Crop Disaster Assistance Program
NRCS: Natural Resources Conservation Service
PSA: Packers and Stockyards Act
RCDGP: Rural Cooperative Development Grant Program
RMA: Risk Management Agency
SARE: Sustainable Agriculture Research and Education
USDA: U.S. Department of Agriculture
VAPG: Value-Added Producer Grant
WFRP: Whole-Farm Revenue Protection Program
WRDA: Water Resources Development Act

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